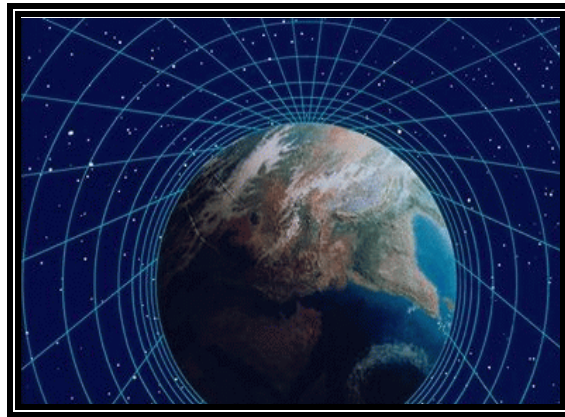


Idaho Technology Education

Technology 2001 Taskforce Report



Idaho Division of Professional-Technical Education
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PTE 382

2001



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Various sections of this document utilized and/or modified with permission of the Georgia Academic Standards for Technology Education , Idaho State Department of Education and the Idaho Division of Professional-Technical Education.

Message to Technology Education Teachers

July, 2001

Greetings from the Idaho State Division of Professional-Technical Education:

In early 2000 a taskforce of prominent Idaho technology educators was convened and charged with developing standards for Technology Education programs in Idaho. The result of their effort is contained within this document, *The Idaho Technology Education, Technology 2001 Taskforce Report*.

In addition to the adopted standards, pertinent information on topics such as curriculum recommendations, funding, facilities, certification, and approved courses are also included in this document.

If you are a pre-service teacher, this document should provide an overview of the who, what, where, when and why of Technology Education programs. If you are a seasoned veteran, it may serve well as a reference manual for program operations and curriculum development. Either way we hope you find the information contained in these pages useful.

If you have any questions about Technology Education programs or the information provided in this document feel free to call the Division of Professional-Technical Education, 208-334-3216 or email me at cgreen@pte.state.id.us.



Sincerely,

Dr. Clifford L. Green
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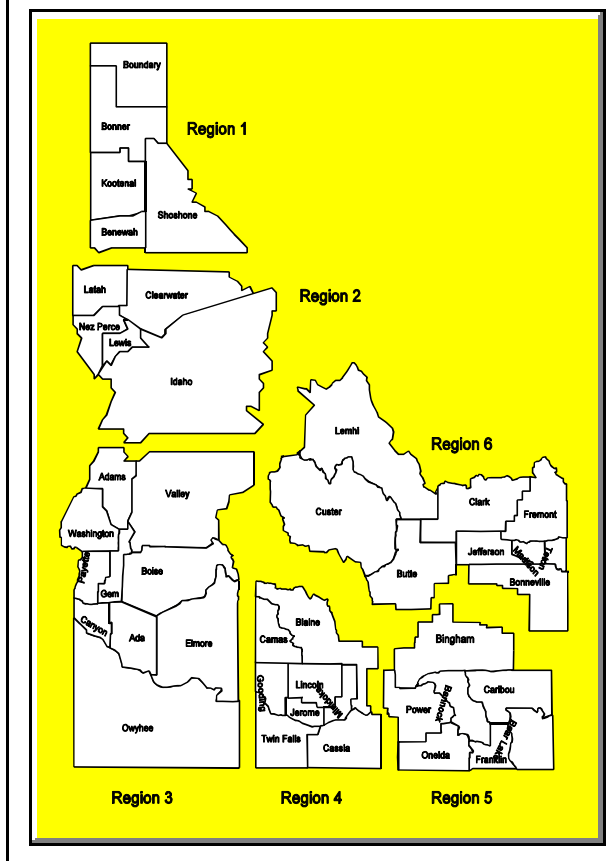
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Last Updated 07/03/01

Figure 1. (Regions)



Overview of Technology Education

Let's start with an explanation of technology. Scientists view technology as the application of science and mathematics for a specific purpose. Historians, engineers and technologists believe technology to be the application of knowledge, tools, and skills to solve practical problems and extend human capabilities. The philosophy of Technology Education programs in Idaho's public schools is firmly grounded in this premises and delivered through a sequential offering of courses in the four major technology systems: Construction; Manufacturing; Power, Energy and Transportation and Communication. The four basic courses are in turn supported by two additional subject fields, Principles of Technology and Emerging Technologies.

Communications Systems - the exchange of information

Manufacturing Systems - the production of goods

Construction Systems - the fabrication of structures

Power/Energy/Transportation Systems - the movement of objects or forces

Principles of Technology - the study of the basic principles of physics

Emerging Technologies - the study of new and evolving technologies

Technology Education curriculum covers the evolution of technology and its subsequent effects on people, the environment, and society, providing students an opportunity to gain understanding, use, and control of technology. Students learn how to adapt to change, deal with forces that influence their future, and participate in controlling their future. Manipulative activities with tools, machines, materials, and processes help students hone their creativity, decision-making, teaming, critical thinking, and problem solving skills.

Elementary Technology Education

Technology Education at the Elementary level is not mandatory but highly recommended. The Division of Professional-Technical Education seeks to promote integration of Technology Education content into existing elementary math, science and language arts curriculum.

Middle School Technology Education

Technology Education at the middle school is exploratory in nature and content, focusing on problem solving, career orientation, and learning for tomorrow's changing society. The middle school can be the most influential stage in a student's technological experience. It is at this level that future educational pursuits are being formulated. Moreover, the middle school program serves as a feeder program for advanced level courses and is the basis for developing a healthy appreciation for technology.



While studying Technology Education at the Junior High/Middle School level, students develop an appreciation of the scope of contemporary technology; study and analyze the materials, products, processes, problems, uses, developments, and contributions of technology; identify the occupational areas and educational programs in technological career fields; research plan, design, construct and evaluate problems and projects common to the technological career fields; experience the organization and management systems of business and industry, and learn safe use of basic tools, machines, materials, and processes associated with technology.

Secondary Technology Education

Technology Education at the high school level (grades 9-12) provides an in-depth foundation for career preparation and offers students the opportunity to make informed choices about potential occupations. Students can choose to pursue a variety of interests or may decide to concentrate on a career path. Regardless of career goals, as students become more adept with consumer



awareness, problem solving and occupational readiness. Technology Education classes help students explore the job market and make sound decisions about additional education or possible careers. Whether the additional education is at a professional-technical school, college, university, or in industry, Technology Education classes will help prepare students to make sound, logical choices.

The curriculum offers sequential courses that build on previously learned content without repetition. Technology Education students gain competence in each of the four systems through the practical application of:

- basic scientific and mathematical principles researching and solving problems involving the materials, processes, products, and services of industry and technology
- in-depth understanding and appreciation of technology in our society and culture
- developing core skills in processes, materials, tools, and machines
- making decisions regarding postsecondary technology careers, engineering programs, service-related fields, or advanced Professional-Technical programs
- experiencing the organization and management systems of business and industry

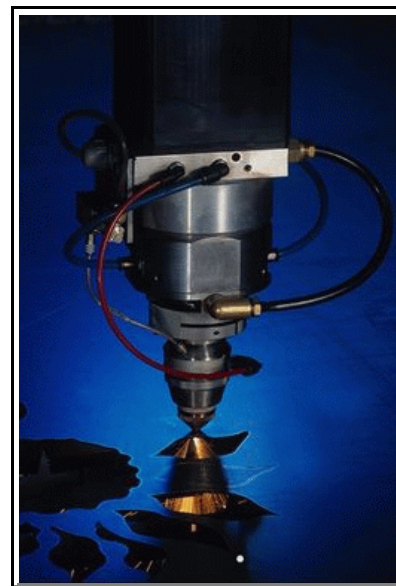
Technology Education takes learning with technology one step farther than traditional disciplines. Technology becomes a school subject, with the ultimate goal of technological literacy for everyone. The versatility of Technology Education can also be found in its integration and application into traditional content areas such as reading, math, science, language arts providing relevance as well as rigor to a student's educational experience.

The *Standards for Technology Education* and *The Idaho Achievement Standards* should be integrated throughout the elementary and secondary education learning experience. Teaching technology provides

tremendous opportunity for students to apply an integrated content through acquisition of knowledge, design and use of materials and processes to systematically solve real world problems. Critical thinking, teamwork, research and development, experimentation, and testing help deliver the goals of the Technology Education curriculum and enrich the entire learning and teaching process. Ultimately, the result is educators provide students with opportunities to develop their own perspectives of technology and its interrelationships with the world in which we live as well as develop ethics, personal integrity and employment skills.

The State of Technology Education in Idaho

In a recent article in the Idaho Statesman, Boise earned a ranking of 12th in the nation over all for high technology growth rate. Similar to Boise, from Northern to Southern Idaho our state boasts a plethora of technology based companies. In construction, Morrison-Knudsen (Washington Group); in power and energy, INEEL; in plastic injection manufacturing D-8; in metal manufacturing, Uhling/Miltec and Simplot; in high tech and manufacturing, Hewlett-Packard and Micron Technologies as well as many others. Business and industry as well as government and higher education understand the value of individuals who are technologically knowledgeable and savvy. For this reason, teaching Technology Education is of great importance. Ultimately, elementary, middle, and high school teachers play a critical role in the development of technologically literate citizens.



However, even with the large role that various technologies play in Idaho, technology, in and of itself, should not be viewed as a panacea for education or society's woes. The focus of Technology Education should be on appropriate application. If our children develop and use technology in the context of the community's and nation's goals and values, they will continue to experience even more ways to work, enjoy leisure, communicate, and organize their lives.

Demographics

As seen in Table 1, a large portion of Idaho Technology Education programs are located in junior high and high schools with a student population of 800 or more. The remaining programs are located in high schools with a student population of less than 799.

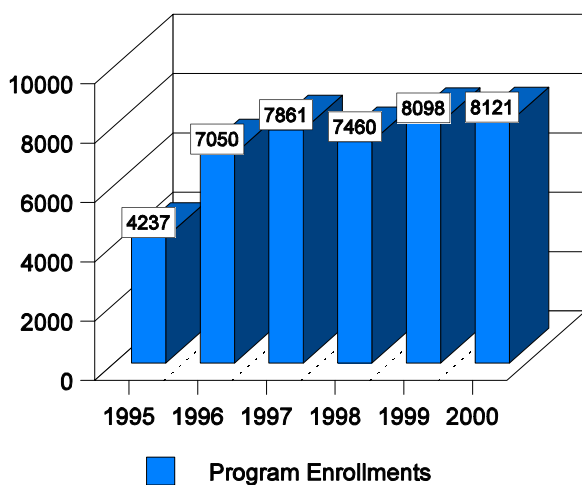
Table 1. (Secondary Schools with PTE Technology Education Programs)

Secondary Schools with Technology Education Programs		
School Population	Number of High School Programs	Number of Junior High Programs*
800 and over	48	17
350-799	17	3
150-349	13	2
0-149	8	0

*Middle School programs are not eligible for added cost reimbursement.

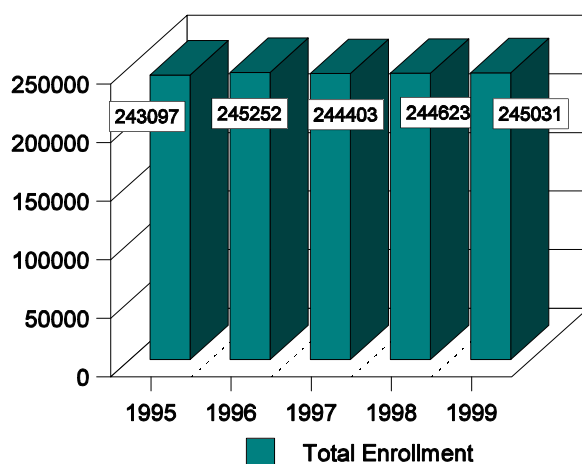
Because Technology Education programs can be found in elementary, middle school, junior high and high schools integration within and across schools with core subjects is encouraged.

Figure 2. (Technology Education 9-12 Enrollment in Funded Programs by Year)



During the 2000 school year, there were approximately 8,121 students enrolled in and served by the 55 districts offering Technology Education programs. As seen in Figure 2, enrollment in Technology Education programs has almost doubled in the last five years with the majority of growth taking place between 1995 and 1996. The cause of the large increase is believed to be a result of the implementation of the formula funding “added cost” reimbursement system.

Figure 3. (Idaho K-12 Enrollments)



As compared with total enrollment of students between 1995 and 1999, Technology Education programs had a net growth of 3,861 students while the state of Idaho in its entirety had a net growth in enrollment of 1,934 students during the same time period.

Table 2. (Technology Education Special Populations 2000)

Special Populations 2000		
Disabled	503	6%
LEP	185	2%
Economically Disadvantaged	1,476	18%
Single Parents	40	0.5%

Traditionally, enrollment in Technology Education programs been exclusively male. Between 1998 and 2000 the percentage of females rose only four percent from thirteen percent to seventeen percent. In comparison, 45% of all students enrolled in Professional-Technical education programs were female. When compared with all Professional-Technical programs progress still needs to be made to achieve equity.

As seen in Table 2, the 2000 data on special populations reveals that 6% of Technology Education students were disabled; 2% were LEP; 18% were economically disadvantaged and .05% were single parents.



Image and Communication

Image and Communication

Successful Technology Education programs involve support systems that stimulate innovation and risk taking at local and state levels. Advocates at all educational levels are needed to provide guidance and support to teachers implementing programs. Advocacy can be developed by:

- Establishing a program advisory committee
- Networking and sharing resources and ideas with other teachers. Try an open house for faculty
- Establishing business and industry support
- Gathering and publicizing data about Technology Education successes
- Informing all educators and the community about the contributions of Technology Education to the total education of the student. Be sure to emphasize the overriding importance of good teaching
- Promoting the positive image of Technology Education, by bringing programs in compliance with minimum standards
- Encouraging communication among the State Division of Professional-Technical Education, local school administration and Technology Education instructors on policy changes and reporting procedures
- Effectively communicating via the local media, state Professional-Technical Education publications, to portray a positive image of what is happening in Technology Education programs
- Host student orientations or field trips from feeder schools
- Be honest about any problems
- Be prepared to explain how Technology Education is funded at your school
- Be prepared to explain how results are being measured
- Extend and invitation to parents



Parent Involvement

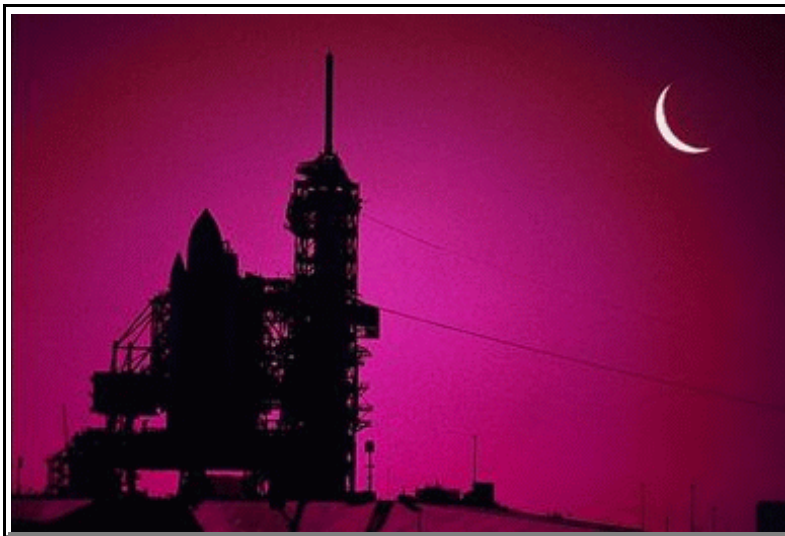
There are many ways in which parents can assist the instructor, principal, and administrator in the challenge of operating a Technology Education program, several of which are listed below. Parents are the closest community source and are the most interested segment of the community. They are partners in education and represent the industrial sector because they comprise the workforce in the community. They need to be involved in all aspects of program operation from Advisory Committee members to classroom volunteers and substitute instructors. Their businesses become extended classrooms, they provide fiscal and physical resources, and they can serve as the sounding board for the school for bond issues and other community involvement. Parents are essential to school-to-work and site-based education initiatives.

Parents can help in any of the following ways:

Assist the school board and administration in offering a strong Technology Education program that is essential for all students; work with teachers in broadening the relationships between the school and industry in the region and local community; offer their services as volunteers or guest presenters, based upon their various occupational backgrounds and write or call local legislators to recommend adequate support for technology programs as well as for local funding issues.

Future Directions

The 21st century will bring new technologies that will be more complex, mature, and versatile than those we utilize today. The realities of today's technological advancements will undoubtedly reshape how we work, how we create, how we view the world, how we learn, and most importantly, what we must learn. We are now in a position to exercise options that were beyond our comprehension a mere decade ago. How we educate a generation that can comprehend, cope with, and direct these technologies is a challenge to which schools must respond.



Business and Industry seek employees who can calculate, solve problems, communicate effectively, and most importantly, people who have organized thought processes and a good work ethic. These are the skills that are emphasized in Technology Education programs. Technology Education also provides students with an understanding and appreciation for the technological concepts, principles and systems which are the basis of all occupations. In this spirit the Division has created and implemented a workforce education option as part of the curriculum offerings which provides students the opportunity to learn in the workplace. Students taught by industry mentors alongside of other employees as an active participant in both the educational community and business and industry sectors.

Because the only future certainty is uncertainty, it is incumbent that Idaho's technology education teachers provide opportunities for students to understand, use and control current technology with an eye towards those on the cutting edge. Only then will our students be prepared to succeed in the new world.

Technology Education Vision, Mission, and Philosophy

Vision

Technology Education in the 21st century, will be a vital part of every student's education. It is our vision that every student will be afforded the opportunity to become technologically literate.

Mission

The mission of Technology Education in Idaho is to develop student technological literacy and to provide an opportunity for those students to learn about technology process and the knowledge needed to solve problems and extend human capabilities.

Philosophy

Technology Education is a dynamic performance-based discipline providing students the opportunities to develop leadership, self-confidence, technical and academic knowledge. Using current technologies and processes, outcomes are achieved through interdisciplinary, action-based activities involving teamwork, problem solving, economic and environmental issues related to the future.

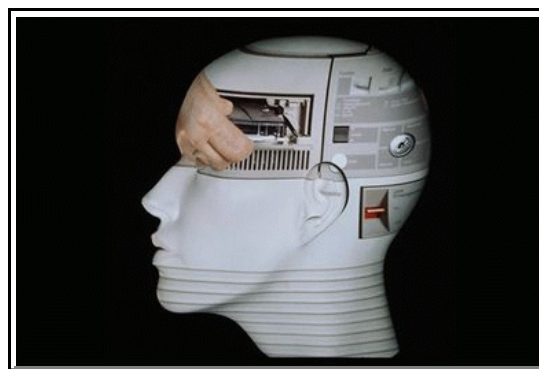


Standards for Technology Education

What are standards? Standards specify what students should know and be able to do. They provide specific evidence of the level of learning desired and serve as targets for the teaching of goals and objectives. Idaho's standards for Technology Education include both content and performance components.

- Content refers to *what* students should know and be able to do.
- Performance tells *how* students will show or give evidence that they have met a standard.

Why are standards necessary? Standards serve as a directional compass for both teaching and learning. By setting standards, students, parents, educators, government officials, and citizens know what students should have learned and what teachers should have taught at a given point in time. Without precise standards, both students and teachers may drift off course in their learning and instructional efforts. Clear statements about what students must know and be able to do are essential to ensure that our instructional programs provide students with the knowledge and skills necessary for success.



Why are state-level standards important? Public education has historically been a state responsibility. The state administrator and the legislature are responsible for ensuring that all students have equal access to high-quality education programs. At minimum, this responsibility requires clear statements of what all students in the state should know and be able to do as well as evidence that students are meeting these expectations. In addition, standards form a basis on which to establish the content of a statewide assessment system.

Why does Idaho need its own standards? While educational needs may be similar among states, state values may differ. Idaho standards should reflect the collective values of the citizens of Idaho and be tailored to prepare students for economic opportunities that exist in Idaho, the nation, and the world.

Must a school or a school system adopt Idaho's Standards for Technology Education? Adopting the standards is voluntary, not mandatory. However, Idaho law requires that all public school systems adopt and implement the *Achievement Standards*. The Idaho Technology Standards were developed with the achievement competencies in mind and are designed to help meet or in some cases exceed these competencies. Therefore, it would behoove local educators to review and employ the standards as they work toward creating a quality instructional program.

How will local school systems use the standards? School systems may use the standards as guides for developing local grade-by-grade curriculum. Implementing standards may require some school systems to upgrade school and system curricula. In some cases, this may result in significant changes in instructional methods and materials, local assessment strategies, and professional development opportunities for teaching and administrative staff.

What are the next steps beyond the standards? There are several needs and options after the standards are implemented. It is understood that the standards by themselves will not sufficiently address or correct deficiencies in a Technology Education curriculum. As a follow-up to the standards, sample instructional and teaching activities are included with this report on CD-Rom. Additional content is being developed to provide practical examples of how the standards can be met and employed. In addition, program evaluation strategies based on the standards will need to be designed, field tested, and implemented as a means of assessing and certifying the quality of instruction programs.

How were the standards developed for Idaho? The standards in this document represent the result of a three-phase educational research procedure. Phase-one focused on a comprehensive review of the literature pertaining to Technology Education curriculum designs, state curriculum goals, as well ongoing standards projects from other states and the national standards project. The result of this phase established a starting point for the Idaho standards.

Phase-two brought together educators and business & industry representatives from across the state to provide specific input on the educational benchmarks needed for Technology Education. Exemplary teachers representing middle, and high schools as well as teacher educators from collegiate programs provided valuable information that yielded criteria for developing the Idaho standards for Technology Education. In addition, business and industry representatives helped to guide the standards development by offering important and valuable suggestions that helped to clarify the real-world needs for students as they prepare for their adult lives. This input was collected during focus group meetings.



Phase-three used the results from the focus group meetings to ascertain the perspectives of the entire Technology Education teacher population in Idaho. Teachers were able to provide input on the proposed standards criteria with the collective results providing a prioritized list of standards for Technology Education.

Idaho Standards

The format for the Idaho Technology Education Content Standards was adopted from the International Technology Education Association's *Standards for Technological Literacy*. The individual standards in this report are provided in five major categories:

- Nature of Technology
- Technology and Society
- Design
- Abilities for a Technological World
- The Designed World

Each of the five major categories is further broken down into standards and further into benchmarks at predefined grade level strata for each standard. Standards specify what Technology Education students should know and be able to do in order to be technologically literate; while benchmarks provide fundamental content elements for each of the 20 standards.

Content Standard–Nature of Technology

Performance Objective:

Students will develop an understanding of The Nature of Technology.

Rationale:

In today's world, technology is a complex social enterprise that includes a variety of different applications. The word "technology" typically conjures up a myriad of different ideas and it is because of this it is often misunderstood. When asked to define technology, one might respond that technology is computers or the Internet, however, technology is much more. Simply put, technology is how humans apply resources such as information, knowledge, energy, tools, system, space, time, and capital to solve practical problems, modify the world, and extend their capabilities (Chamuris, C. & Wallace M., 1996).



Table 3. (Standards, Nature of Technology)

Standards and Benchmarks for Nature of Technology				
Standards	Benchmarks K-2	Benchmarks 3-5	Benchmarks 6-8	Benchmarks 9-12
The Characteristics and Scope of Technology	<ul style="list-style-type: none"> - Natural World and human-made world - People and Technology 	<ul style="list-style-type: none"> - Things found in the human-made world - Tools, materials, and skills - Creative thinking 	<ul style="list-style-type: none"> - Usefulness of technology - Development of technology - Human creativity and motivation - Product demand 	<ul style="list-style-type: none"> - Nature of technology - Rate of technological diffusion - Goal directed research - Commercialization of technology
The Core Concepts of Technology	<ul style="list-style-type: none"> - Systems - Resources - Processes 	<ul style="list-style-type: none"> - Systems - Resources - Requirements - Processes 	<ul style="list-style-type: none"> - Systems - Resources - Requirements - Trade offs - Processes - Controls 	<ul style="list-style-type: none"> - Systems - Resources - Requirements - Optimization of trade offs - Processes - Controls
Relationships Among Technologies and the Connections Between Technology and Other Fields	<ul style="list-style-type: none"> - Connections between technology and other subjects 	<ul style="list-style-type: none"> - Technologies integrated - Relationships between technologies and other fields of study 	<ul style="list-style-type: none"> - Interaction of systems - Interaction of technological environments - Knowledge from other fields of study and technology 	<ul style="list-style-type: none"> - Technology transfer - Innovation and invention - Knowledge protection and patents - Technological knowledge and advances of science and mathematics and vice-versa

Content Standard – Technology and Society

Performance Objective:

Students will develop an understanding of Technology and Society.

Rationale: People develop and use technology to enhance their quality of life. Technologies such as those found in the automobile, microprocessor, nuclear power, genetic engineering, and factory automation have enhanced our mobility, enabled us to harness new energy resources, increased food production, reduced disease, and freed people from tedious or dangerous tasks. While each of these technologies has very distinct advantages, they also have clear disadvantages that need to be weighed carefully by those who live in a technological society. Given the rapid growth in technological capability, it is important that every citizen take an active role in promoting the common good by making informed decisions about risks and benefits of technology. To be active citizens, students need to understand the positive and negative impacts of technology on society and the environment. They need to weigh carefully the benefits and risks of technologies, and make informed decisions about technological issues.

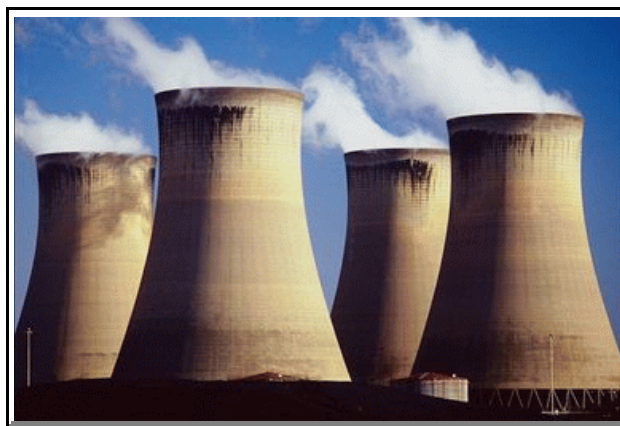


Table 4. (Standards, Technology and Society)

Standards and Benchmarks for Technology and Society				
Standards	Benchmarks K-2	Benchmarks 3-5	Benchmarks 6-8	Benchmarks 9-12
The Cultural, Social, Economic, and Political Effects of Technology	- Helpful or harmful	- Good and bad effects - Unintended consequences	- Attitude toward development and use - Impact and consequences - Ethical issues - Influences on economy, politics and culture	- Rapid or gradual changes - Trade offs and effects - Ethical implications - Cultural, social, economic and political changes

The Effects of Technology on the Environment	<ul style="list-style-type: none"> - Reuse and/or recycling of material 	<ul style="list-style-type: none"> - Recycling and disposal of waste - Affects environment in good and bad ways 	<ul style="list-style-type: none"> - Management of waste - Technologies repair damage - Environments vs. economic concern 	<ul style="list-style-type: none"> - Conservation - Reduce resource use - Monitor environment - Alignment of natural and technological processes - reduce negative consequences of technology - Decisions and trade-offs
The Role of Society in the Development and Use of Technology	<ul style="list-style-type: none"> - Needs and wants of individuals 	<ul style="list-style-type: none"> - Changing needs and wants - Expansion or limitation of development 	<ul style="list-style-type: none"> - Development driven by demands - Inventions and innovations - Social and cultural priorities - Acceptance and use of products and systems 	<ul style="list-style-type: none"> - Different cultures and technologies - Development decisions - Factors affecting designs and demands of technologies
The Influences of Technology on History	<ul style="list-style-type: none"> - Ways people have lived and worked 	<ul style="list-style-type: none"> - Tools for food, clothing, and protection 	<ul style="list-style-type: none"> - Process of inventions and innovations - Specialization of labor - Evolution of techniques, measurement, and resources - Technological and scientific knowledge 	<ul style="list-style-type: none"> - Evolutionary development of technology - Dramatic changes in society - History of technology - Early technological history - The Iron Ages - The Middle Ages - The Renaissance - The Industrial Revolution - The Information Age

Content Standard – Design

Performance Objective:

Students will develop an understanding of Design

Rationale: Technological systems have always been a part of daily life. Recently, they have become more apparent because of their sophistication and influence. By coordinating and processing resources, these systems help to provide products and services such as food, clothing, shelter, entertainment, health care, security, and other necessities and comforts of life. Though often subtle, these systems are everywhere in our world and, without exception, they impact all of us.

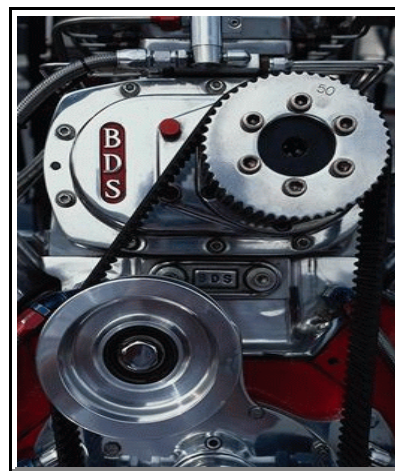


Table 5. (Standards, Design)

Standards and Benchmarks for Design				
Standards	Benchmarks K-2	Benchmarks 3-5	Benchmarks 6-8	Benchmarks 9-12
The Attributes of Design	<ul style="list-style-type: none"> - Everyone can design - Design is a creative process 	<ul style="list-style-type: none"> - Definitions of design - Requirements of design 	<ul style="list-style-type: none"> - Design leads to useful products and systems - There is no perfect design - Requirements 	<ul style="list-style-type: none"> - The design process - Design problems are usually not clear - Design needs to be refined -Requirements
Engineering Design	<ul style="list-style-type: none"> - Engineering design process - Expressing design ideas to others 	<ul style="list-style-type: none"> - Engineering design process - Creativity and considering all ideas - Models 	<ul style="list-style-type: none"> - Iteration - Brainstorming - Modeling, testing, evaluating, and modifying 	<ul style="list-style-type: none"> - Design principals - Influence of personal characteristics - Prototypes - Factors in engineering design
The Role of Troubleshooting, Research and Development, Invention, and Innovation, and Experimentation in Problem Solving	<ul style="list-style-type: none"> - Asking questions and making observations - All products need to be maintained 	<ul style="list-style-type: none"> - Troubleshooting - Invention and innovation - Experimentation 	<ul style="list-style-type: none"> - Troubleshooting - Invention and innovation - Experimentation 	<ul style="list-style-type: none"> - Research and development - Researching technological problems - Not all problems are technological or can be solved -Multidisciplinary approach

Content Standard – Abilities for a Technological World

Performance Objective:

Students will develop Abilities for a Technological World.

Rationale: Humans have historically been involved in technological activities. We use our knowledge, physical ability and technology to solve problems and seize opportunities. The design, development, and use of technological items are direct results of human resourcefulness. When a new technology is introduced and opportunities are acted upon, the technology begins to evolve bringing more opportunity and still more problems to solve.

Technological items and processes are inspired by a need, an end result, or just out of human curiosity. Students must be challenged to solve technological problems by drawing upon their knowledge to plan a solution, select the proper resources and processes, create, and then evaluate the solution.



Table 6. (Standards, Abilities for a Technological World)

Standards and Benchmarks for Human Ingenuity/Abilities for a Technological World				
Standards	Benchmarks K-2	Benchmarks 3-5	Benchmarks 6-8	Benchmarks 9-12
Apply Design Processes	<ul style="list-style-type: none"> - Solve problems through design - Build something - Investigate how things are made 	<ul style="list-style-type: none"> - Collecting information - Visualize a solution - Test and evaluate solutions - Improve design 	<ul style="list-style-type: none"> - Apply the design process - Identify criteria and constraints - Model a solution to a problem - Test and evaluate - Make a product or a system 	<ul style="list-style-type: none"> - Identify a design problem - Identify criteria or constraints - Refine the design - Evaluate the design - Develop a product or system using quality control - Reevaluate final solution

Use and Maintain Technological Products and Systems	<ul style="list-style-type: none"> - Discover how things work - Use tools correctly and safely - Recognize and use everyday symbols 	<ul style="list-style-type: none"> - Follow step-by-step instructions - Select and safely use tools - Use computers to access and organize information - Use common symbols 	<ul style="list-style-type: none"> - Use information to see how things work - Safely use tools to diagnose, adjust and repair - Use computers and calculators - Operate systems 	<ul style="list-style-type: none"> - Document and communicate processes and procedures - Diagnose a malfunctioning system - Troubleshoot and maintain systems - Operate and maintain systems - use computers to communicate
Assess the Impact of Products and Systems	<ul style="list-style-type: none"> - Collect information about everyday products - Determine the qualities of a product 	<ul style="list-style-type: none"> - Use information to identify patterns - Assess the influence of technology - Examine trade-offs 	<ul style="list-style-type: none"> - Design and use instruments to collect data - Use collected data to find trends - Identify trends - Interpret and evaluate accuracy of information 	<ul style="list-style-type: none"> - Collect information and judge its quality - Synthesize data draw conclusions - Employ assessment techniques - Design forecasting techniques

Content Standard – The Designed World

Performance Objective:

Students will develop an understanding of The Designed World.

Rationale: The natural world consists of plants, and animals, earth, air, water and fire – resources that would exist without human intervention and invention. The social world includes customs, cultures, political systems, legal systems, economies, religions, and various other mores that humans have derived to govern their interactions and relationships with one another. The designed world consists of all modifications that humans have made to the natural world to satisfy their own needs and wants. The designed world is a product of a design process, which provides ways in which to turn energy and resources, tools and materials, machines and equipment, people and information, capital and time – into products and systems.

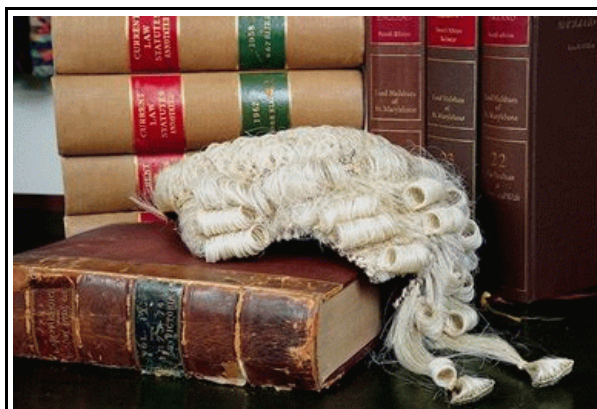


Table 7. (Standards, The Designed World)

Standards and Benchmarks for The Designed World				
Standards	Benchmarks K-2	Benchmarks 3-5	Benchmarks 6-8	Benchmarks 9-12
Medical Technologies	<ul style="list-style-type: none"> - Vaccinations - Medicine - Products to care for people and their belongings 	<ul style="list-style-type: none"> - Vaccines and medicine - development of devices to repair or replace certain parts of the body - Use of products or systems to inform 	<ul style="list-style-type: none"> - Advances and innovations in medical technologies - Sanitation process - Immunology - Awareness of genetic engineering 	<ul style="list-style-type: none"> - Medical technologies for prevention and rehabilitation - Telemedicine - Genetic therapeutics - Biochemistry

Agricultural and Related Biotechnologies	<ul style="list-style-type: none"> - Technologies in agriculture - Tools and materials for use in ecosystems 	<ul style="list-style-type: none"> - Artificial ecosystems - Agricultural wastes - Processes in Agriculture 	<ul style="list-style-type: none"> - Technological advances in agriculture - Specialized equipment and practices - biotechnology in agriculture - Artificial ecosystems and management - Development of refrigeration, freezing, dehydration, preservation, and irradiation. 	<ul style="list-style-type: none"> - Agricultural products and systems - Biotechnology - Conservation - Engineering design and management of ecosystems
Energy and Power Technologies	<ul style="list-style-type: none"> - Energy comes in many forms - Energy should not be wasted 	<ul style="list-style-type: none"> - Energy comes in many forms - Tools, machines, products, and systems use energy to do work 	<ul style="list-style-type: none"> - Energy is the capacity to do work - Energy can be used to do work using many processes - Power is the rate at which energy is converted from one form to another - Power systems - Efficiency and conservation 	<ul style="list-style-type: none"> - Law of conservation of energy - Energy sources - Second law of thermodynamics - Renewable and non-renewable forms of energy - Power systems are a source, a process and a load
Information and Communication	<ul style="list-style-type: none"> - Information - Communication - Symbols 	<ul style="list-style-type: none"> - Processing information - Many sources - Communication - Symbols 	<ul style="list-style-type: none"> - Information and communication systems - Communication systems encode, transmit, and receive information - Language of technology 	<ul style="list-style-type: none"> - Parts of information and communication systems - Information and communication systems - The purpose of information and communication technology - Communication systems and subsystems - Many ways of communicating - Communication through symbols

Transportation Technologies	<ul style="list-style-type: none"> - Transportation systems - Individuals and goods - Care of transportation products and systems 	<ul style="list-style-type: none"> - Transportation system use - Transportation systems and subsystems 	<ul style="list-style-type: none"> - Design and operation of transportation systems - Subsystems of transportation system - Governmental regulation - Transportation processes 	<ul style="list-style-type: none"> - Relationship of transportation and other technologies - Intermodalism - Transportation services and methods - Positive and negative impacts of transportation systems - Transportation processes and efficiency
Manufacturing Technologies	<ul style="list-style-type: none"> - Manufacturing designs - Design of product 	<ul style="list-style-type: none"> - Natural materials - Manufacturing processes - Consumption of goods - Chemical technologies 	<ul style="list-style-type: none"> - Manufacturing systems - Manufacturing goods - Manufacturing processes - Chemical technologies - Materials use - Marketing products 	<ul style="list-style-type: none"> - Servicing and obsolescence - Materials - Durable and non-durable goods - Manufacturing systems - Interchangeability of parts - Chemical technologies - Marketing products
Construction Technologies	<ul style="list-style-type: none"> - Different types of buildings - How parts of buildings fit together 	<ul style="list-style-type: none"> - Modern communities - Structures - Systems used 	<ul style="list-style-type: none"> - Construction designs - Foundations - Purpose of structures - Building systems and subsystems 	<ul style="list-style-type: none"> - Infrastructure - Construction processes and procedures - Maintenance, alterations, and renovation - Prefabricated materials

Program Requirements & Recommendations

Current program standards for Technology Education have been approved by the State Board of Professional-Technical Education. Refer to the standards section of this report for a detailed listing of established standards. Funding, legislation and the changing backgrounds of students entering Technology Education continues to bring changes to most programs. The prudent and balanced use of program standard guidelines can help maintain program quality while at the same time equip students for successful careers or continued education.

Administration (Required)

- Professional-Technical funding is administered and program fiscal records are maintained in accordance with state policies and guidelines.
- A budget exists for the professional-technical program and the instructor is involved with its development.
- Contracts for extended employment must include a plan approved by the school administrator. The plan should be consistent with program philosophy and goals. The time beyond the normal academic year supported with professional-technical education funds must have a program of work with emphasis on program improvement and specialized student instruction.

Staff (Required)

- Professional-Technical instructor(s) hold(s) current credentials and endorsements.

Staff (Recommended)

- Professional-Technical instructor(s) participate in professional development activities.

Program of Study (Required)

- A program advisory committee provides input for program improvement.
- Student leadership development is integral to the program as generally provided through student professional-technical organizations such as TSA.

Program of Study (Recommended)

- A written program philosophy is compatible with the educational objectives of the school district.
- Written program goals reflect the needs of community, business/industry, and students.
- Curriculum supports reinforcement of basic academic, technical and employability skills.
- Resources provided support the curriculum.
- An evaluation is conducted and used for program planning and improvement.

Equity and Access (Required)

- Opportunities are provided for all students to participate in all professional-technical programs.
- Nondiscriminatory counseling, curriculum design, classroom procedures, and placement services are followed.

Student Services (Required)

- Guidance services are provided.

Student Services (Recommended)

- Instructor, in cooperation with school counselor, is involved with guidance and placement.
- A plan for disadvantaged and/or handicapped students is used for assessment of interests, abilities, and special needs.

Facilities and Equipment (Required)

(See Recommended Facilities)

- Students are provided with clean, safe classrooms/laboratories.
- Enrollment does not exceed capacity standards as mutually established and recorded in the State Division of Professional-Technical Education (see recommended facilities).
- Equipment is systematically updated, maintained, and inventoried.
- Laboratory facilities and equipment support curriculum.

Instructor Certification

Individuals employed to teach/direct reimbursable professional-technical classes or programs in secondary or postsecondary schools are ***required*** to hold a Secondary Certificate ***with current endorsement in an appropriate occupational discipline***.

If an applicant does not meet requirements, a current occupational teaching credential from another state may be endorsed for use in Idaho up to five years. After that period, Idaho standards for the certificate ***must*** be met. Employment agreements are valid only if the occupational educator hold the credential required for the assignment of service to be performed. Appeals regarding certification or the Code of Ethics as related to professional-technical educators ***may*** be directed to the Idaho Professional Standards Commission.

Applications for professional-technical education certification need to be sent to the State Department of Education, Teacher Certification, P.O. Box 83720, Boise, Idaho 83720-0027. For questions, phone (208) 334-3216; fax (208) 334-2365; or email ddean@pte.state.id.us.

Becoming Certified

Occupational Teacher Preparation

Teachers graduating from an approved occupational teacher preparation program qualify for an occupational endorsement to teach in programs approved by the State Division of Professional-Technical Education. The occupational teacher shall have accumulated two (2) years (4000 clock hours) of related work experience or shall have completed an approved practicum in their respective field of specialization.

Interim Certificate in Lieu of Secondary Occupational Endorsement

Secondary-certified educators may apply for the Interim Certificate if they have not completed the required occupational teacher preparation course work. This certificate is issued for one (1) year and may be renewed twice, provided there is annual progress toward the needed endorsement. An additional renewal may be granted because of extenuating circumstances.

Technology Education Endorsement

To qualify for the Technology Education Endorsement (6-12) Twenty semester credit hours to include course work in each of the following areas must be completed.

- Communication Technology
- Computer Applications
- Construction Technology
- Electronics Technology
- Manufacturing Technology
- Power, Energy and Transportation
- Principles of Technology

Evolution of the Technology Education Endorsement

In the early 90's, the endorsement for Industrial Arts was changed to Industrial Technology. At this time Industrial Arts instructors were required to take a series of courses to receive the new endorsement. The purpose of the change was to refocus programs to become more technology oriented in content and application. To aid in this effort grants were provided by the Division to those districts wishing to upgrade their programs.

In 1997, the Industrial Technology Endorsement was renamed the Technology Education Endorsement. The change was non-substantive regarding qualifications of the instructor; however, instructors were asked to have the endorsement name changed upon renewal of their certificates.

Program Visitation

The State Division Program Manager for Technology Education shall from time-to-time visit programs throughout the state. Program visits may be formal or informal in nature and may focus on any or all the following areas:

- Program philosophy and objectives
- Program instructional components
- Program leadership development of students and instructors
- Program recruitment and enrollment of students
- Program public relations and publicity
- Program facilities and equipment
- Program staffing
- Program administration and supervision
- Program finances
- Program evaluation

See the appendix for a copy of the Technology Education program evaluation form.

Advisory Committees

Today's rapidly changing society requires that the educational institutions and the communities they serve work closely together, especially in Professional-Technical Education. The State Board for Professional-Technical Education is not the only agency with interest in professional-technical programs. In Idaho, Professional-Technical Education may look to local advisory committees for assistance and guidance. These committees have no administrative authority but instead provide a strong connection between the community and the schools they serve.

Policy Statement–State

It is the policy of the Idaho State Board for Professional-Technical Education that an advisory committee be established for Professional-Technical Education programs before reimbursement can be authorized. The committee shall be advisory only, having no administrative authority, and is not created to take away any of the rights and/or privileges of the local governing board and administrative staff.



Policy Statement – Local

The local governing boards should develop a policy statement authorizing the establishment of and necessity for a professional-technical advisory committee(s) for the schools' or institution's professional-technical education programs.

Types of Committees

1. Umbrella Advisory Committee - an umbrella advisory committee is representative of the community and can be established for all Professional-Technical Education courses offered in a school district. It consists of individuals who represent each professional-technical occupational area. (This committee is typically found in secondary schools.)
2. Program Advisory Committee - a program advisory committee is representative of a specific occupational area that advises that particular program. A separate committee serves each Professional-Technical Education program offered in a school district or postsecondary institution.
3. General Advisory Committee - a general advisory committee may be established to serve as a directional committee for the administration rather than for specific program areas. Membership is representative of community leaders from industrial, commercial, management, financial, legal, labor, and other fields. (This committee is typically found in postsecondary institutions.)

Purpose

A professional-technical advisory committee is a group of laypeople selected by local educational administrators to serve in an advisory capacity to the Professional-Technical program. The purpose of an advisory committee is to advise school administration and instructors with respect to the development and

maintenance of quality Professional-Technical Education programs. Properly functioning advisory committees help local schools ensure that programs are consistent with the needs of the students and the community.

Structure

1. An advisory committee is a group of laypeople who are:
 - a. recognized for their expertise in their specific occupational area
 - b. representative of the employers and employees in the community
 - c. organized to advise school personnel on matters concerning the Professional-Technical education program
2. The advisory committee shall be composed of business, industry and labor representatives of the occupation(s) for which training is provided. The educational administrators should study the collective make-up of persons employed in the occupation, including the geographical area served, and select representation that matches the industry and the community.
3. Representation on the committee should include as appropriate to the population of the local community, persons from both sexes, racial and/or ethnic minorities and the handicapped.
4. At the first or second meeting, the committee should consider establishing a set of operating policies.

Organization

Effective advisory committees are those whose members are recognized professionals in their areas of responsibility, have an understanding and acceptance of the committee objectives and a desire to accomplish them through teamwork and cooperation.

Constructive planning should be undertaken by educational administrators prior to organizing a committee. This will help assure the effectiveness of the committee.

After determining the type of committee needed and preparing a general structural plan, the administrator should appoint a person to serve as temporary chair. The administrator and/or chair should:

1. Select committee members.
2. Send letters of appointment signed by the appropriate administrator.
3. Call the first meeting, provide time and place, and attach a tentative agenda.

Functions of Advisory Committees

Advisory committees can perform a wide variety of functions. The following list, not intended to be all inclusive, should be useful in providing direction.

1. Provide assistance regarding:
 - a. Current labor needs
 - b. The relevance of programs (courses being offered by the educational agency in meeting current job needs)

- c. Job opportunities for students and graduates
 - d. Placement activities
 - e. The relationship of basic skills such as problem-solving, communication, mathematics, and employability skills and habits to job needs.
2. Determine community needs:
 - a. For Cooperative Professional-Technical Education programs
 - b. For short term training classes
 - c. For new and emerging occupations
 - d. For nontraditional employees
 - e. For inservice of employees
 3. Assist in the preparation and selection of program material to assure it meets the needs of students and reflects industry needs.
 - a. Review program objectives
 - b. Review present course outlines and proposed textbooks
 - c. Assist in identifying competencies to be taught, including basic skills.
 - d. Suggest revisions or additions
 4. Assist with program evaluation activities.
 5. Provide inservice opportunities for instructors.
 6. Provide support services for students enrolled in nontraditional programs who need special assistance.
 7. Recommend and assist in obtaining resource personnel and guest speakers.
 8. Assist in surveys.
 - a. Determine data to be gathered
 - b. Suggest methods for securing data
 - c. Assist in data collection and interpretation, i.e., status of men and women in nontraditional programs
 9. Provide suggestions for public relations activities.
 - a. Promote Professional-Technical Education in the community
 - b. Provide current occupational information to counselors
 - c. Participate in exhibits or displays
 - d. Develop plans for recognizing students through the media
 - e. Help prepare and review brochures explaining the Professional-Technical Education program
 - f. Advise on forms of program promotion
 - g. Become advocates for students in nontraditional occupational programs
 - h. Assist with job placement
 10. Support professional-technical student organizations.

- a. Suggest means of raising chapter funds
 - b. Help secure speakers
 - c. Offer suggestions for obtaining financial aid for individual members
 - d. Serve as judges for competitive and other events
 - e. Attend leadership development activities and other chapter events
11. Help plan special events such as:
- a. Professional-Technical Education Week
 - b. National Student Organization Week
 - c. Professional-Technical Banquets and other applicable social activities
 - d. Special events and demonstrations
 - e. Field trips to industry
12. Assist in the implementation of Tech Prep activities. The committee members of consortium schools should be selected for ad hoc and standing committees.

In addition to the previous functions, advisory committees may also wish to provide financial and legislative support; help establish scholarships and awards for honor students; support the administration in local appropriations and provide support for state and national legislation affecting Professional-Technical Education.

The committee may wish to assist the school or institution in determining other uses for existing facilities. Such activities may involve initiating activities for securing equipment and donations; making provisions for short-term training classes, and assisting in meeting the needs of handicapped students.

Membership

Membership of any advisory committee will vary depending on qualifications and number of people needed.

1. Qualifications for Membership
Program advisory committee membership should consist of people from the community including representation from business, industry and labor who possess knowledge and work experience in the Professional-Technical program area for which they will serve. It is recommended that one of the members be either a student or a recent program graduate. Members of a general advisory committee should be more broad-based in their expertise. Local educational personnel are not suggested for membership on occupational program committees.
2. Number of Members
The size of the committee is determined locally with consideration given to the size and makeup of the community. It is recommended that membership be not less than three nor more than nine.
3. Method of Designation
Members of the program advisory committee should be selected by the local administration with the advice and counsel of the professional-technical teachers. The governing board should select the general advisory committee members.

4. Term of Membership:
 - a. A regular term of office should be established. Membership should be staggered to allow for new members while retaining some experienced representatives to maintain continuity.
 - b. It is recommended that membership on the committee be limited to three years. The local administration should consider this when developing policies. Persons should be appointed with staggered terms to provide community continuity.
 - c. Vacancies should be filled with persons with similar backgrounds by the local administrator for the remainder of an unexpired term.

Organizing and Conducting Meetings

Schools vary in how frequently advisory committees are asked to meet. The most common plan is to schedule meetings at least twice per year. Meetings should be held only if there is work to be accomplished. The purpose of the committee helps to determine the frequency of the meetings. Contributions of advisory committee members depend to a great extent on how they are prepared for and oriented to their roles. If the professional-technical advisory committee is to be effective, responsibilities should be divided between all members so that no one individual has total responsibility for the committee's success.

The initial meeting is critical. It must establish and maintain the interest and support of committee members. Until a chair is selected by the committee, the administrator should appoint someone to serve temporarily in this capacity. It is essential that this person contact members, organize and conduct the first meeting.

For more information see the Professional-Technical Administrators Handbook for Advisory Committees.

Approved Technology Education Courses

The following are courses approved by the State Division of Professional-Technical Education.
Reference: *Professional-Technical Programs, Titles, Codes and Descriptions* (2000).

Table 8. (Approved Technology Education Courses)

Course Number	Course Title
TE 1901	Exploring Technology
TE 1905	Fundamentals of Technology
Construction	
TE 1920	Construction Systems I
TE 1921	Construction Systems II
TE 1922	Introduction to Cabinetry
TE 1923	Advanced Cabinetry
Manufacturing	
TE 1931	Manufacturing Systems I
TE 1932	Manufacturing Systems II
TE 1933	Introduction to Robotics
TE 1934	Robotics Applications
TE 1935	Mechanical Design Applications
TE 0402	Computer Aided Manufacturing (CAM) Technology
Power/Energy/Transportation (PET)	
TE 1940	Power, Energy and Transportation Systems I
TE 1941	Power, Energy and Transportation Systems II
TE 1942	Introduction to Laser Technology
TE 1943	Vehicle Design Technology
TE 0501	Introduction to Electronics Technology
TE 0502	Electronics Applications
TE 0801	Aerospace/Flight Technology

Communications	
TE 1951	Communication Systems I
TE 1952	Communication Systems II
TE 1953	Digital Imaging Technology
TE 1959	Video Editing Technology
TE 0220	Introduction to Drafting/Design
TE 0222	Introduction to Mechanical Drafting/Design
TE 0224	Introduction to Architectural Drafting/Design
TE 0226	Introduction to Electronics Drafting/Design
TE 0228	Introduction to Structural Drafting/Design
TE 0203	Technical Illustration Technology
TE 0240	Graphic Design Technology
TE 0303	Introduction to Computer Aided Drafting/Design
Networking and Related Technologies**	
TE 0703	Applied Physics I
TE 0704	Applied Physics II
TE 1926	Emerging/Engineering Technology Studies
TE 1928	Biotechnology Studies
TE 1954	Introduction to Information and Communication Technologies (ICT)
TE 1955	Information and Communication Technologies – Networking Applications
TE 1956	Information and Communication Technologies – Telecom Applications
TE 1957	Information and Communication Technologies – Video/Graphic Application
TE 1971	Principles of Technology I
TE 1972	Principles of Technology II
TE 9800	Occupational and Career Experience

** Instructors must have the appropriate industry and/or professional-technical certification

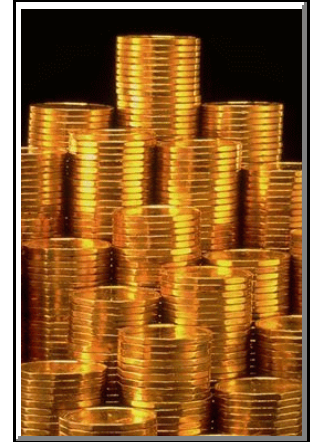
Capstone Courses:

Technology Education curriculum consists of a core of approved courses which are systematically sequenced to build on previously learned competencies and should reflect advancements in technology and approved practices throughout technology industries. Those courses which complete a sequence of the core are referred to as capstone courses.

Last Updated 07/03/01

Funding for Approved Programs

GOAL : Through a partnership between the State of Idaho and local school districts, Technology Education Programs will be provided funding for up-to-date equipment, supplies, and resources in such an exemplary manner that these programs will be models of excellence and achievement in preparing and supporting students in personal growth, career awareness and leadership development.



- The State Division of Professional-Technical Education in conjunction with the Idaho legislature shall provide supplementary funding to assist school districts with the *added costs* associated with operating a quality Technology Education Program.
- Local school districts will continue to provide necessary funding to meet budgetary needs of Technology Education Programs.
- Local school districts will continue to encourage and support Technology Education Programs to be involved in local, district, state, regional, and national activities and career development events as related to program content.
- Local school districts will encourage Technology Education instructors to conduct effective summer programs which extend beyond the normal academic year.
- Local school districts are encouraged to support Technology Education instructors in professional development and program improvement activities.
- The State Division of Professional-Technical Education shall support local programs by promoting available grant sources and encouraging local grant applications.
- The State Technology Education Program Manager shall review and monitor Technology Education programs based on program standards and adjust funding as necessary.

Added Cost Reimbursement Funding Formula

The State Division of Professional-Technical Education provides funding to assist school districts with the added cost associated with offering approved Technology Education programs. Currently, the funding is awarded based on the **number of approved courses** offered during the school day. Funding is not dependent on student enrollment in an individual course or program. This funding is prorated for programs with more or fewer approved courses.

Allowable Expenditures for State Added Cost Reimbursement

Professional-technical money is distributed to offset the added costs of operating professional-technical programs. Costs associated with a normal classroom are not reimbursable (such as texts, regular teacher salary, desks, etc.)

Approvable Items by Budget Category

1. **Salaries, benefits and reimbursement for Time Beyond the Normal Academic Year:** Up to 100 percent of a maximum of eight weeks (depending on program area) beyond the normal academic year is approvable. Paid vacation may not be included. These contracts require that an appropriate program of work documenting activities in which the instructor is involved during the extended time be on file in the building principal's office. Activities related to formal instruction, project visitations, establishment of work sites, student organizations, and professional improvement are allowable. It is expected that the primary focus of this extended time will be instructional activity, including project/work visitations. Only those benefits associated with the portion of actual salary reimbursed are allowable.
2. **Travel:** Instructor travel costs relating to professional development, specialized instruction and supervision of student contests and conferences are reimbursable. Describe anticipated professional and program development activities which will improve the professional-technical program. Approvable activities include, but are not limited to: professional seminars, workshops, state sponsored meetings, summer conference and back-to-industry experiences related to the professional-technical program. **(Workshop fees may be included, but not professional dues or tuition costs.)**

Travel for supervision of student conferences and contests should also be included here. The Division does not reimburse student conference travel through a separate process.

3. **Other Expenses:** Only those expenses not fitting into the other 4 categories should be included here. The primary use for this category is for outside services contracted by the district.
4. **Instructional Materials and Supplies:** Items to be purchased must be directly related to the program. Approvable instructional materials and supplies may include such items as: reference texts, student manuals, durable aids, and computer software. Regular classroom texts and other items associated with a standard instructional program are **not** reimbursable.
5. **Instructional Equipment:** Items to be purchased must be directly related to the program. Equipment means tangible property having a useful life of more than one year and an acquisition cost of \$300 or more per unit. Instructional equipment must be identified on Form 25 for inventory purposes (to be submitted with the 10R).

Last Updated 07/03/01

The program funding for a typical school year is outlined in Table 9.

Table 9. (Added Cost Reimbursement Funding)

Full-Time Equivalent	Program Units	Estimated Funding*
.80 - 1.00	1.0	\$6,840
.60 - .79	.8	\$5,472
.40 - .59	.6	\$4,104
.20 - .39	.4	\$2,736

* Based on a full comprehensive program

Recommendations for Technology Education Programs

- Minimum program standards be verified for continuation of a funded program.
- Individual Technology Education program compliance with minimum program standards should be reviewed at least every five years by the Program Manager with the Idaho Division of Professional-Technical Education.
- Programs not in compliance with minimum standards shall be placed on conditional approval or probationary status, followed by loss of program funding if improvement is not evident within one year.
- Maintain the regular program funding for secondary Technology Education programs. As available, funding be increased to address new initiatives or priorities.
- Efforts be made to suggest appropriate uses of federal funds in regular professional-technical programs.
- Consider development of a pilot program initiative to provide additional competitive funding to develop model programs and stimulate new and innovative efforts in Technology Education programs.

Primary Funding Sources for Secondary Programs

Regular Program Added-Cost Funding

Source

1. Purpose –
 - a) To help pay for the added cost of providing professional-technical programs of study to high school students.
 - b) To stimulate creation of new professional-technical programs.
2. Method of Accessing – School districts apply for the funds (Form 10-N). Due February 15. The amount of funds to be granted to each district is based on the number of approved reimbursed periods taught in each program (Form 10-D).
3. Distribution – Schools must request reimbursement based on actual expenditures (Form 10-R). Equipment with a purchase price more than \$300 must be inventoried (Form 25). Requests for reimbursements are due by July 15.

Professional-Technical School Funds

Source

1. Purpose –
 - a) To provide high-end, high-quality, state-of-the-art professional-technical programs that are too expensive to offer in a single comprehensive high school setting.
 - b) To provide programs based on industry standards that lead to industry certification.
2. Method of Accessing – Districts or Cooperative Service Agencies must apply for Professional-Technical School approval. Applications are due by the first Friday of July for funding to begin one fiscal year later.
3. Distribution – Funds are distributed based on ADA calculated by using aggregate hours and/or aggregate attendance. The added-cost support factor is calculated by multiplying .33 times the support units. Seventy percent of the amount is distributed in December and the final payment is distributed following the third enrollment reporting period.

Perkins III Federal Funds

Source

1. Purpose –
 - a) To help all students achieve professional-technical and academic skills.
 - b) To encourage the integration of professional-technical and academic instruction.
 - c) To link secondary and postsecondary programs of instruction.
2. Method of Accessing – Districts or consortiums of districts apply for funding. Based on a five year plan, annual applications and program improvement plans are used to continue funding each year. Applications are due by May 15.
3. Distribution – Schools must request reimbursement based on actual expenditures (Form 10-R). Equipment with a purchase price more than \$300 must be inventoried (Form 25). Requests for reimbursements are due by July 15.

Other Sources -- One-Time Grants & Special Grants

1. Purpose – Designated by source of funds and intent of the grant. Examples are: one-time equipment grants, private foundation IT funds, etc.
 - a) Method of Accessing – RFP, local need/request, or application.
 - b) Distribution – Schools must request reimbursement based on actual expenditures (Form 10-R). Equipment with a purchase price more than \$300 must be inventoried (Form 25). Requests for reimbursements are due by July 15.

Recommended Facilities

In the spring of 1999, the State Division of Professional-Technical Education established a task force to develop prototypical educational specifications for professional-technical facilities for the State of Idaho. The task force identified educators (in both secondary education and post secondary education) and private sector representatives from across Idaho to work on fourteen different committees representing areas of Professional-Technical Education. Those committees met with professional school facility planners in the spring of 1999. In the fall of 1999, the committee members reviewed draft prototypical educational specification documents. In the late fall of 1999, the professional facility planners presented the final draft of this document to educators from all six regions of the State to take final comments and suggested improvements. The following information for Technology Education facilities is a result of the efforts of this committee and the Division.



Areas

Table 10. (Area Specifications for Facilities Planning)

DESCRIPTION	EST. STAFF	EST. STUDENTS	SQ. FT. TOTAL
Storage (Materials)			200-500
Storage (projects)			300-500
Storage (tools)			250-500
Classroom/clean lab	1-2	16-24	2000
“Dirty” Lab	1-2	16-24	2000-3000
Restrooms/Clean Up Area			200
Offices	1-2	1-2	120
Paint/Finish Room	2-4	2-4	150-400
Video Lab/Broadcasting	1-2	4-6	200-500
Darkroom	1-2	4-6	100-200
Welding/Gas (outside storage)			
Construction yard	1-2	6-10	

Internal/External Relationships - (What should be near this area)

- The classroom should be near the lab and office.
- The storage area should be near the classroom and the lab.
- The material storage area needs to be near an outside delivery area.
- A cleanup area and restrooms should be near the lab.
- The video production area should be near the classroom or “clean area.”
- Any outside storage should be close to the lab.
- These classes should be near other noisy classes.

Internal/External Relationships - (What should not be near this area)

- These classes should not be near any quiet areas.

UtilitiesPlumbing:

- Plumbing should be positioned or dampened to minimize noise.
- In the cleanup area a gang sink should be provided.
- A drinking fountain should be plumbed in the lab, away from machinery.
- An eye wash and emergency shower should be located in the lab.
- Drains will need to be provided in the cleanup area.
- Multiple compressed air outlets should be plumbed to the perimeter of the lab and classroom and in the outside area.
- Consider natural gas plumbed to the foundry if needed.
- Welding gas should be piped from the source to stations in the lab.
- Outside water should be plumbed near the lab door.

HVAC:

- The heating, ventilation, and air-conditioning system needs to be of sufficient size to keep each instructional space at a comfortable temperature.
- The system needs to have a fresh air exchange system to keep high air quality in each instructional space.
- The general classroom supply and exhaust ducts need to be positioned to minimize any draftiness in the room.
- The HVAC controls need to be designed to allow individuals the ability to modify the classroom temperature for the instructional requirements of the classroom activities.
- The controls need to be positioned so that the room temperature is not “misread” (e.g., not too close to a door, window, or vent).
- A dust collection and particulate filtration system is needed, especially in the dirty lab. If this is a floor system, provide a duct cleanout.
- Provide exhaust systems at each welding station.
- An exhaust system is needed in the paint and finish areas.
- The broadcasting area may need additional air-conditioning.

Electrical:

- Electrical supply outlets need to be sufficient to meet the electrical equipment needs of the modern classroom.
- Electrical supply outlets need to be placed on each stationary wall and at the counters in each classroom.

- Electrical supply outlets need to be provided for any built-in audio-visual equipment installed in the classroom (e.g., television, VCR, electric ceiling screen, etc.) Controls for the screen should be by the light switches.
- Each classroom should have occupancy sensors installed for lights.
- The perimeter of the clean lab will need extra outlets both four-plex and duplex.
- Variable power needs to be provided in the clean lab.
- Drop down overhead power is needed in multiple locations of the clean lab, particularly at the center work tables.
- In the dirty lab, three-phase power is needed around the perimeter and hard wired to the stationary equipment.
- A master switch should be installed controlling all equipment.
- The welding booths will need 110 and 220 volt power.
- Electricity needs to be provided for an overhead door.
- Power needs to be provided to the dust collection system.
- Explosive proof switches are needed in the paint room.
- Electrical supply should be oversized to accommodate future growth.
- When planning lighting placement, consider computer screen glare.
- Electrical supplies should be oversized for future expansion.

Lighting:

- Lighting needs to be even across the classroom.
- The lighting controls need to accommodate an instructor's need to vary the light intensity for different instructional tasks.
- The light fixtures need to be energy efficient to keep operating costs at a minimum.
- The dirty lab will require 80-100 foot candles of light.
- Increased lighting is needed in the paint room.
- Security lights are needed in the outside storage area.
- Natural lighting should be provided wherever practical.
- The lighting needs to be higher than a normal classroom in the clean lab with no shadows.
- All lighting should have staged controls.
- Specialty lighting is needed in the broadcast room.

Technology:

- The clean lab should have 20 data drops for student computers around the perimeter of the lab. Two data drops should be provided for the instructor's computer. The instructor's data drops need to be placed in different spots in the room to allow the teacher's desk to be moved periodically.
- A data drop to the ceiling projector will be needed in the clean lab.
- Data drops are needed in each office.
- Data drops may be needed in the storage room and tool room.
- The dirty lab will need ceiling data drops to the work tables.
- Some fixed equipment may need data drops.
- Each classroom needs to have access to cable TV for commercial, satellite and closed circuit broadcasts over the cable.
- Phone jacks should be placed near the door to the classroom and near the teacher's area.
- The phone system should be programmed to enable outgoing calls directly from the classroom but incoming calls allowed only after going through the main office switchboard.

- Each classroom should be equipped with an integrated clock, intercom, and bell system.
- Each classroom should be equipped with a TV, VCR, electric screen and overhead/LCD projector.
- A Smart Board should be considered for the classroom.
- The area should be wired with data cable to enable the connection of a local area network and a wide area network.
- Oversized conduit should be considered for future growth.

Surfaces

Floors:

- Vinyl composition tile should be installed in the clean lab and all areas other than the dirty lab.
- Sealed concrete is needed in the dirty lab.
- Zoned striping should be provided in the dirty lab and in the clean lab where appropriate.

Walls:

- A 4'x16' white board with friction clips needs to be provided.
- Wall and ceiling surface materials need to accommodate the acoustical needs of the classroom and the labs.
- In the labs, masonry with washable, brightly painted surfaces are needed.
- Consider high windows for some natural light if possible.
- Windows need to be of double pane glass with operable integral blinds where practical.
- Interior windows between the office and the labs are necessary.
- If possible, place Interior windows between the two labs.
- All windows should have safety glass installed.
- Some movable walls may be appropriate in some of these spaces.
- Tackable wall space should be provided in the classroom and clean lab.
- Slanted windows should be installed in the broadcast room between the main video room and the control room for sound deflection.

Ceilings:

- The ceiling height of the dirty lab should be 12'-14'. All other ceilings should be 9'-12'.
- The ceiling should be a durable suspended ceiling with acoustical tile.

Doors:

- Each general classroom should have a standard sized exit door.
- Each general classroom door should have a small narrow window.
- An electric overhead door should be installed in the dirty lab. A remote control door opener should be considered.
- Double doors should be installed between the labs.
- Double doors are needed to the paint room.

Storage

- Each clean lab needs to have base cabinets in the perimeter for 20 computer stations. Each station should have open knee space for two students.
- Each clean lab needs to have overhead wall cabinets above the base cabinets.
- Each clean lab needs to have sufficient storage for those specialized books, magazines, and other instructional materials necessary for successful instruction.
- Each clean lab needs to have some locking cabinets specifically for the personal effects of the instructors.

- Space is needed for two (2) four-drawer, letter-size file cabinets.
- The storage room should have adjustable shelving and floor-to-ceiling cabinets. Some of these cabinets need to be secure.
- Some of the cabinets in the storage room need to be designed to hold flammable hazardous materials.
- Some base and some overhead cabinets are needed in the office.
- Some of the cabinets in the office need to be secure and need to be floor to ceiling.
- Some of the office base cabinets need to have knee space for a computer desk.
- The dirty lab needs storage under the center work tables. This storage should be a combination of open shelving and some drawers.
- The dirty lab should also have storage under the perimeter work benches. This storage should be open shelving.
- Storage racks are needed for the metal, wood, and sheet goods.



Furniture and Equipment

- Each clean lab needs to be equipped with a television, VCR, overhead/LCD projector, and electric ceiling mounted screen.

Table 11. (Equipment List for General Fabrication Technology Education Labs)

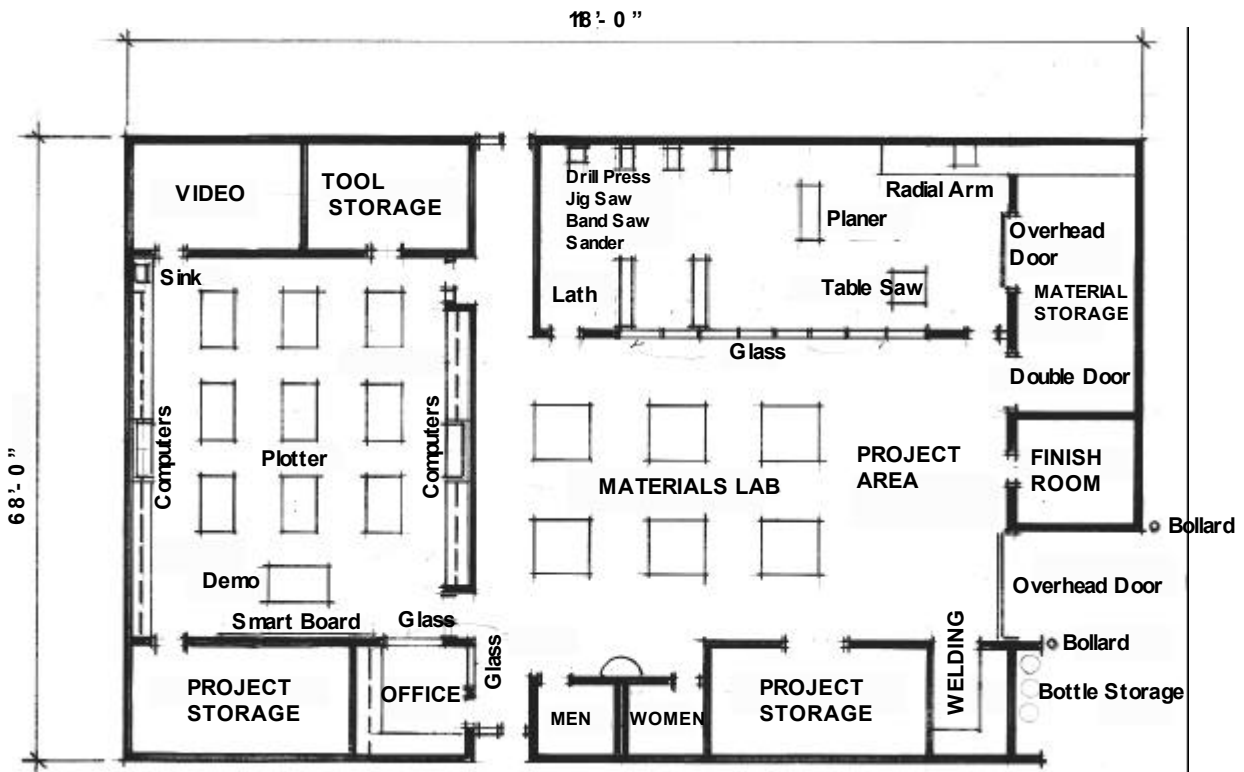
Wind tunnel	Jointers
CNC machines	Thickness plane or sander
Laser cutter	Lathes
Drill press	Buffers
Routers	Computers and peripherals
Radial arm saw	Scales
Table and Miter saw	Video Equipment
Welders	Air Compressor
Band saw	Microwave equipment
Generators	Telecommunications
Injector molders	Plotters

Program offerings may vary given community needs, check with the state program manager for a list of equipment for each program area.

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Safety Issues

- Safety striping is needed on the lab floors.
- The correct storage for hazardous materials should be provided.
- A first aid kit should be provided in the lab.
- All furniture should be ergonomically correct.



TECHNOLOGY EDUCATION

The Matrix Group

Not to Scale

Figure 4. (Blueprint for Technology Education Lab)

Program Inventory

The local education agency (LEA) is required to maintain a local inventory of equipment. The local education agency is also responsible for maintaining the equipment and exercising reasonable care and safekeeping of this equipment.

When equipment is acquired by a consortium, wholly or in part with funds provided by the IDPTE, title shall be vested in the consortium fiscal agent and maintained on inventory until disposed of in accordance with state and/or federal regulations governing such properties by IDPTE.

APPROVAL MUST BE GIVEN BY THE STATE DIVISION OF PROFESSIONAL-TECHNICAL EDUCATION PRIOR TO ANY DIVERSION, SALE, OR TRADE-IN OF EQUIPMENT PURCHASED WITH FUNDS PROVIDED IN WHOLE OR IN PART BY THE IDPTE.



1. DEFINITIONS

- a. "Acquisition cost" of an item of purchased equipment means the net invoice price of the equipment, including the cost of modifications, attachments, accessories, or auxiliary apparatus necessary to make the equipment usable for the purpose for which it was acquired.
- b. "Amount received for trade-in" of an item of equipment traded in for replacement equipment means the amount that would have been paid for the replacement equipment without a trade-in minus the amount paid with the trade-in. The term refers to the actual difference, not necessarily the trade-in value shown on an invoice.
- c. "Equipment" means tangible personal property having a useful life of more than one year and an acquisition cost of \$300 or more per unit.
NOTE: Computer software is considered to be a supply.
- d. "Local education agency" (LEA) means a local school board or a State corrections educational agency.
- e. "Personal property" means property of any kind except real property. It may be tangible-having physical existence, or intangible-having no physical existence, such as patents, inventions, and copyrights.
- f. "Replacement equipment" means property acquired to take the place of other equipment. To qualify as replacement equipment, it must serve the same function as the equipment

replaced and must be of the same nature or character, although not necessarily the same model, grade, or quality.

- g. IDPTE - Idaho State Division of Professional-Technical Education
- h. Special or Ancillary Services - Projects or programs which are supportive to Professional-Technical Education (Research, Guidance, Personnel Development and Curriculum Development).
- i. "Supplies" means all tangible personal property other than equipment
NOTE: Computer software is considered to be supplies.

2. TITLE

When equipment is acquired by an LEA, wholly or in part with funds provided by the IDPTE, title shall be vested in the LEA and maintained on inventory until disposed of in accordance with state and/or federal regulations governing such properties by IDPTE.

When equipment is acquired by a consortium, wholly or in part with funds provided by the IDPTE, title shall be vested in the consortium fiscal agent and maintained on inventory until disposed of in accordance with state and/or federal regulations governing such properties by IDPTE.

3. REQUESTING EQUIPMENT FROM IDPTE

In order to purchase equipment and receive reimbursement from the IDPTE, the LEA/Consortium must secure prior approval (**Approval of the Federal Application or FORM 10-F Budget Request constitutes prior approval**). Only the specific number and kind of approved items in the Federal Application or FORM 10-F may be purchased unless an amendment has been approved by the appropriate state program manager. Approval of an amendment must be in writing before a purchase is made.

AMENDMENTS -- Changes may be expected because of price increases, recommendations by advisory committees, obsolescence, or other reasons. All amendments for purchase of equipment should be requested prior to February 15.

4. ACTUAL EQUIPMENT PURCHASE

- a. The LEA/Consortium Fiscal Agent is responsible for purchasing equipment approved by the IDPTE for use in Professional-Technical programs. All local and state laws, regulations and procedures must be followed in the purchase of equipment. (For example, if local regulations require formal bids, then formal bids must be obtained.) After an LEA/Consortium Fiscal Agent has been notified that equipment has been approved for purchase, such equipment must be purchased or a signed purchase order shall be executed by April 1 of the current fiscal year. If invoices for equipment purchased are not received and payment made by the LEA/Consortium Fiscal Agent prior

to June 1 of the current fiscal year, reimbursement may be disallowed and the equipment request may become null and void.

- b. All equipment purchased by LEAs/Consortia with funds provided by the IDPTE must meet all federal and state Occupational Safety and Health Administration rules and regulations. LEAs/Consortia should require a statement of safety compliance of rules and regulations from vendors before purchase is made.

5. SUBMITTING CLAIM TO IDPTE FOR EQUIPMENT PURCHASED

The State Division of Professional-Technical Education Inventory Record Form #25 must be submitted with the CS7/10R Form to substantiate reimbursement claims that include equipment meeting the definition identified in Section I-C. Put only items for one program/project on each Form #25. A paid invoice must be on file at the LEA/Consortium Fiscal Agent and retained for compliance with state and federal regulations.

6. USE OF EQUIPMENT PURCHASED WITH FUNDS PROVIDED BY THE IDPTE

The LEA/Consortium shall retain and use all equipment in an approved Professional-Technical program as long as there is a need for the purpose intended for such equipment. Equipment must be used in an approved professional-technical program or for special professional-technical projects and/or ancillary services.

Equipment purchased with funds provided in whole or in part by the Idaho State Division of Professional-Technical Education, when not being used to carry out the purposes for which it was purchased or other professional-technical education purposes may be used for other instructional purposes if: (a) the acquisition of the equipment was reasonable and necessary for the purpose of conducting a properly designed project or activity; and (b) the other use of the equipment is after regular school hours or on weekends.

The use of the equipment purchased with funds provided in whole or in part by the Idaho State Division of Professional-Technical Education when not being used to carry out the purposes for which it was intended must: (a) be incidental to the use of that equipment for the purposes for which it was purchased; (b) not interfere with the use of that equipment for the purposes for which it was purchased; and (c) not add to the cost of using that equipment for the purposes for which it was purchased.

7. MAINTENANCE OF EQUIPMENT

Adequate maintenance procedures shall be implemented by the LEA/Consortium to keep the equipment in good working condition and repair. **The cost of such maintenance is borne by the LEA/Consortium.**

8. INVENTORY CONTROL SYSTEMS TO BE MAINTAINED

Procedures for managing equipment (including replacement equipment) until transfer, replacement, or disposition takes place shall, at a minimum, meet the following requirements:

- a. Property records shall be maintained accurately. For each item of equipment, the records shall include:
 - 1. A description of the equipment, including manufacturer's model number, if any.
 - 2. An identification number, such as the manufacturer's serial number.
 - 3. Identification of the grant under which the recipient acquired the equipment.
 - 4. The information needed to calculate the Federal share of the equipment.
 - 5. Acquisition date and unit acquisition cost.
 - 6. Location, use and condition of the equipment, and the date the information it was reported.
 - 7. All pertinent information on the ultimate transfer, replacement, or disposition of the equipment.
- b. A physical inventory of equipment shall be taken and the results reconciled with the property records at least once every 2 years to verify the existence, current utilization, and continued need for the equipment. Any differences between quantities determined by the physical inspection and those shown in the accounting records shall be investigated to determine the causes of the differences.
- c. A control system shall be in effect to insure adequate safeguards to prevent loss, damage, or theft of the equipment. Any loss, damage, or theft of equipment shall be investigated and fully documented by local police or law enforcement officials. The LEA/Consortium Fiscal Agent shall be responsible for replacing or repairing equipment which is lost, damaged, stolen, or destroyed.
- d. Adequate maintenance procedures shall be implemented to keep the equipment in good condition.
- e. Where equipment is to be sold and the Federal Government is to have a right to part or all of the proceeds, selling procedures shall be established which will provide for competition to the extent practicable and result in the highest possible return. (*Section 74.140, EDGAR*)

9. DISPOSITION OR DIVERSION OF EQUIPMENT WHEN NO LONGER NEEDED IN A PROFESSIONAL-TECHNICAL PROGRAM OR CONSORTIUM

- a. In the event the membership of a consortium changes, or if a consortium is dissolved, equipment purchased with IDPTE funds by the consortium will revert to the State Division of Professional-Technical Education. Districts that disengage themselves from a consortium may be allowed to retain equipment purchased if the projects (or programs) are maintained. If no appropriate projects/programs are maintained the Division will transfer the equipment to other appropriate projects/programs based on need.
- b. When there is no longer a need for such equipment to accomplish the purpose of the program or if the equipment becomes worn out or obsolete, the LEA/Consortium Fiscal Agent shall notify the IDPTE of this fact and request disposition instructions and specific

policies governing the particular piece of equipment (Prof-Tech Ed Form #23a). NO EQUIPMENT IS TO BE DIVERTED, SOLD OR TRADED WITHOUT WRITTEN PERMISSION FROM THE IDPTE. The IDPTE will determine the disposition of all equipment purchased with funds provided by the IDPTE.

- c. Sale. The IDPTE may or may not require that money be refunded for its share of the proceeds of the sale of equipment. If a refund is required, it shall be at a rate of the original cost to the LEA/Consortium less the depreciation (see Item XI(e)).
- d. Trade-In. The value of equipment traded will be subtracted from the cost of the new equipment purchased. The IDPTE will calculate the amount of reimbursement on the net cost to the LEA/Consortium. The inventory value of the new equipment will be the trade-in value plus the LEA/Consortium's cost plus the IDPTE share and equal to the purchase price with no "trade-in". The following example demonstrates this method:

New equipment cost	\$900
Trade-in value of equipment traded	<u>-200</u>
Net cost	\$700

Inventory value of new equipment equals:

Trade-in value	\$200
IDPTE reimbursement	+329
LEA cost	<u>+371</u>
Inventory value	\$900

1. All furniture, fixtures, desks, chairs, or similar equipment shall be based on a straight line depreciation method of 20 years or five percent per year with no estimated salvage value.
2. All instructional machines such as power driven saws, grinders, drill presses, all types of welders, washing machines, refrigerators or other equipment which may fall into this grouping, shall be based on a straight line depreciation method of 10 years or 10 percent per year with no estimated salvage value.
3. All computers, computer hardware and computerized equipment such as monitors, printers, CAD, CAM, automotive diagnostics, etc., shall be based on a straight line depreciation method of three years or 33 percent per year with no estimated salvage value. (Equipment can be used beyond the three year period if still serviceable.)
4. In determining the fair market value of equipment, the IDPTE shall have the prerogative to determine the specific category and the depreciated value of the equipment to be disposed of.

10. TERMINATION OF PROGRAM

- a. When a professional-technical program is terminated or temporarily discontinued the IDPTE will determine the time and method of disposition of the equipment.

When written notification provides reasonable assurance that a professional-technical program will be re-instated the school year following a program termination, a maximum period of one year may be allowed before disposition of equipment is undertaken.

- b. The IDPTE will determine the method of depreciation and amount due the federal or state government and notify the local district/Consortium Fiscal Agent accordingly. The value of such equipment will be determined on the basis of the sale price in case of a bona fide sale or the fair market value in the case of discontinuance of use, or diversion for other than professional-technical education purposes.
- c. The actual disposition of the equipment may be accomplished by either of the following methods:
 - 1. The LEA/Consortium Fiscal Agent shall return a cash refund to the IDPTE
 - 2. The IDPTE shall credit the LEA/Consortium Fiscal Agent in the amount of its share at the time of disposition of equipment and transfer such equipment to another professional-technical program or location.
- d. The IDPTE retains the option to transfer any or all equipment purchased solely with State and/or Federal funds.
- e. The value of the equipment will be determined as of June 30 of the fiscal year when the professional-technical program ceased operation. The value of all equipment shall be either the cash value as determined by the supplier of the equipment or the estimated depreciated value based on the following policy, whichever is higher:

Leadership Organizations

Students

The Technology Student Association (TSA) is the national organization for Technology Education students at the kindergarten through twelfth grade levels. Since TSA was chartered in 1978, over 1,500 chapters have been established in 45 states.

The mission of TSA is to create opportunities for students to become technologically literate, to receive leadership training and to become critical thinkers and problem solvers.

TSA chapters take the study of technology beyond the classroom and give students the chance to pursue academic challenges among friends with similar goals and interests. Together chapter members work on competitive events, attend conferences on the state and national level and have fun raising funds to get there.

To start a TSA chapter, all that is needed is a motivated technology teacher and an eager group of students. For more information about starting a local chapter visit the National TSA website at www.tsaweb.org or contact Ron Stone at 208-939-1404 x435.

Instructors

The International Technology Education Association (ITEA) is the largest professional educational association, principal voice, and information clearinghouse devoted to enhancing technology education through experiences in our schools (K-12). Its membership encompasses individuals and institutions throughout the world with the primary membership in North America.

- ITEA's mission is to advance technological capabilities for all people and to nurture and promote the professionalism of those engaged in these pursuits.
- ITEA seeks to meet the professional needs and interests of members as well as to improve public understanding of Technology Education and its contributions
- ITEA represents more than 40,000 technology educators in the U.S. alone who are developers, administrators, and university personnel in the field representing all levels of education.
- ITEA corporate members are comprised of leading technology companies.
- ITEA conducts various professional development programs and holds an Annual Conference -- the largest Technology Education showcase of exhibits and educational sessions in the world.
- ITEA publishes *The Technology Teacher*, *Technology and Children*, *The Journal of Technology Education*, *The Technology Teacher e* (the electronic version), *Curriculum Brief*, and a variety of other publications and videos that lead the profession by providing teaching directions, instructional ideas, and networking opportunities.
- ITEA has ten primary committees that coordinate all aspects of Technology Education and sponsor dozens of meetings, conferences, and exhibits each year.

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- ITEA sponsors an active honors and awards program that recognizes outstanding teachers and programs (K-12) from states, provinces and countries that are affiliated with the Association.
- ITEA also presents award certificates and supports other programs which recognize outstanding efforts in the technology teaching profession.
- ITEA conducts a vigorous public policy program, frequently providing information to government, agencies, associations, and other special interest groups concerning Technology Education. The Association strives to provide an understanding of the importance of Technology Education to the future growth and well-being of all nations.

For additional information about ITEA visit their website at www.iteawww.org

Technology Education Association of Idaho

The Technology Association of Idaho (TEAI) is Idaho's professional organization for technology education instructors employed in elementary, middle school/junior high and high schools.

TEAI Philosophy

Technology Education is a comprehensive action-based educational program that is concerned with technical processes, the evolutions, utilization, and significance with industry and industries' organization, personnel systems, techniques, resources, products, and social and cultural impact. Technology Education programs assist individuals to understand industry and technology and to discover and develop individuals potential. Action-based activities provide the basis for the study of technology. These activities assist individuals in making informed and meaningful occupational choices, provide opportunities for creativity and problem solving, and prepare individuals for entry into advanced technical education postsecondary programs.

For more information visit TEAI's website at www.teai.org or contact Miles Carroll at Idaho Falls High School, 208-525-7740.

Program Curriculum Recommendations

Technology Education programs strive to meet the needs of the communities and students they serve. The content of the program curriculum should reflect the needs of not only the local population but technology industries in general. The curriculum shall consist of a core of approved courses which are systematically sequenced to build on previously learned competencies, and should reflect advancements in technology and approved practices throughout technology industries.

- **Recommendation:** Program enrollment should fall within the guidelines of existing program facility standards, not exceeding a 24 to 1 student to teacher ratio, per class.

Action: Develop suggested student enrollment loads for the program facilities.

- **Recommendation:** Program curriculum shall prepare students with multiple technology competencies in a minimum of two of the following areas:

Communication Technology, Construction Technology, Manufacturing Technology, Power, Energy and Transportation, Emerging Technologies, Fundamentals of Technology Education.



Action: Develop recommended sequences for students to follow which includes a capstone course.



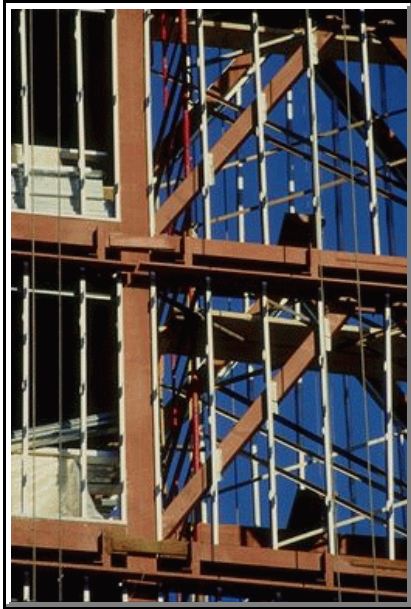
Recommendation: Career information, exploration, and planning should be encouraged.

Action: Inform students about career opportunities available in various technology industries as a part of the curriculum.

Recommendation: Human relations, social skills, leadership development, and interpersonal communication skills should have considerable emphasis in a Technology Education curriculum.

Action: These skills and competencies shall be introduced and reinforced throughout the entire curriculum of a complete program.

Recommendation: Technology Education programs curriculum standards shall map to adopted state math, science, and reading achievement standards.



Action: Teachers of Technology Education programs should develop curriculum based on more than one of the following areas of instruction: *nature of technology, technology and society, technological systems, design, the designed world, and abilities for a technological world*

Recommendation: In order to meet the needs of diverse students, strategies should be taken to enable all students to be successful.

Action: Explore distance learning, school to work and career pathway opportunities.

Curriculum Development and Assessment

Model for Technology Education Curriculum Assessment

(Adapted from “Model for Curriculum Assessment And Standard Implementation” Ethan B. Lipton & Michael A. De Miranda)

Definitions:

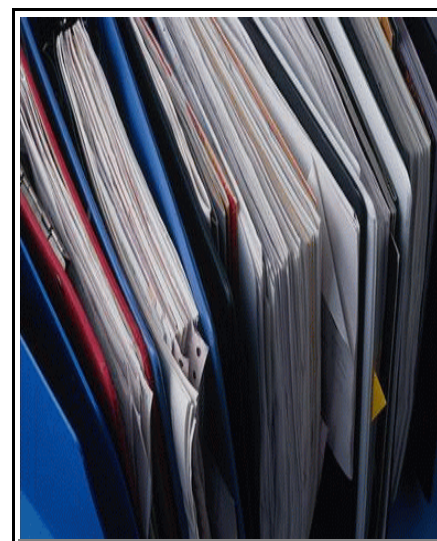
Curriculum – The subject matter that teachers and students cover in their studies, methods, structure, organization balance and presentation of content.

Curriculum Development – The process of planned development of curriculum, pedagogy, instruction and presentation models.

Curriculum Assessment – The process of analyzing the content outcomes of instruction.

Why have a Model for Curriculum Assessment?

Having a model for curriculum development helps document the relationship between technology education and academic content. By using the model your instructors will be able to show that they are teaching powerful material that is in line with state standards. Moreover, they will be able to make the statement “we teach this technology content which is already academic..”



The Plan:

The plan for Technology Education Standards and Curriculum in the State of Idaho includes three components:

1. Idaho State Academic Achievement Standards
2. Idaho Technology Education Content Standards
3. Local Curriculum Development

The relationship between the first two components is critical for the success of the third, locally developed Technology Education curriculum. The goal is for Districts to create a curriculum which simultaneously:

- reflects individual community local needs and values;
- meets or exceeds Idaho Technology Education Standards, and
- provides an avenue for students to meet various Idaho Academic Achievement Standards in mathematics, science and language arts.

To accomplish this three way relationship linkages connecting the components must be created. The first step, creation of the link between the Achievement Standard component and Technology Education Standard component is presently underway. Idaho is one of a handful of states who were chosen for a pilot study in which both sets of standards will be mapped using a taxonomy. Once the link is completed step two can proceed. In step two, the new curriculum assessment model will act as the link between the

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Technology Education Standards and locally developed curriculum. The last and final step consists of the delivery, evaluation and revision of the newly developed local curriculum.

The Curriculum Development Process Model:

Process One (Getting Started)

- Step One – Start by choosing one course within one area to assess. For example, you may wish to assess Communication Systems I under the area Communications Technology or Power, Energy and Transportation Systems II under the PET area
- Step Two – Create an outline of the course
- Step Three – Match the outline of the course to the Idaho Technology Education Standards
- Step Four – Compare outline to all standards (this should show where deficiencies or over emphasis in content exist)
- Step Five – Proceed to Process Two

Process Two (An Action Plan for Revisions)

- Step One – Record titles of selected standards for which changes need to be made in curriculum
- Step Two – Record the action to be taken to make the desired change
- Step Three – Schedule implementation of the change

Process Three (A Business Plan for the Program)

- Step One– Identify equipment, supplies and services which are needed for implementation
- Step Two – Determine the cost of the items needed
- Step Three – Provide a justification for the proposed expenditure

The results of implementation of the Curriculum Assessment Model should include:

- clarification of the goals and objectives of your program
- creation of an improvement implementation strategy
- strengthening of the curriculum
- ability to show how technology education integrates with academic basics
- creation of a balance between what are required through the standards and content that is currently being delivered in Technology Education programs

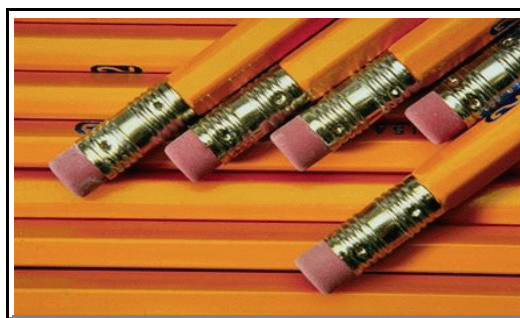


Figure 5. (Curriculum Development Considerations)

1	2	3	4
Factors Influencing Curriculum Considerations – Philosophical – Psychological – Sociological Trends – Educational – Societal – Political	Site Factors Influencing Curriculum and Delivery – Student Abilities – Teacher Capabilities – Core Requirements – Articulation and Dual Enrollment Agreements – State Standards – Facilities – Community – Funding	Idaho Standards for Technology Education	Technology Education Delivery – Curriculum – Instruction – Assessment

In most districts the responsibility of developing or assessing curriculum lies on a team of content experts appointed by either a curriculum coordinator or superintendent. There are many items for the teams consideration which affect the content and flavor of curriculum. For example, national trends, local priorities, state and district assessments and even local personnel affect decisions concerning the focus and delivery of content. In addition development and delivery of curriculum is also affected by student abilities, teacher capabilities, core requirements, and articulation with postsecondary institutions (see Figure 5). Understanding that development and assessment of curriculum is a local control issue, the Division strongly recommends that any curriculum content developed or purchased meet the standards adopted by the Technology 2001 committee. Compliance will ensure a minimum standard of program excellence across the state.

Curriculum Guidelines

The content in this portion of the Technology 2001 Report was created and published in 1995. Presently a curriculum committee is being convened to update the document. The release of the revised Curriculum Guide is scheduled for early 2002, and will include mapping of the content objectives to the International Technology Education Association (ITEA) and the Idaho Achievement Standards. Also included in the release are additional content areas such as Networking and Related Technologies, Bio-technologies and New and Emerging Technologies.

01.0 EXPLORING TECHNOLOGY

Prerequisite: None

Exploring Technology is designed to introduce students to basic technological principles, processes, and skills such as design and problem solving, team decision making, information gathering, and safety. A systems model of communication, manufacturing, power/energy and transportation and construction is presented. Students are exposed to sketching, technical drawing, screen printing, logo and poster development, building of model rockets and bridges, experimentation with computer-assisted graphics, computer-aided design software, electronic devices, and video production. This program is designed to develop an appreciation of technical fields and occupations while learning about skills essential to these systems.

02.0 FUNDAMENTALS OF TECHNOLOGY

Prerequisite: None

Fundamentals of Technology is a prerequisite course for most of the Technology Education systems. Communication skills and tools are the major focus of this course. These same skills are central to all subsequent technology courses. The computer and other electronic devices are necessary for teaching an understanding of contemporary communications, manufacturing, power/energy/transportation and construction systems. An engineering focus of problem solving requires students to define a given problem, conduct appropriate research, develop solutions to the problem, construct prototypes, and evaluate their work.

Fundamentals of Technology is designed to introduce students to those principles and skills used in subsequent technology courses. Students learn to sketch solutions to problems, create technical drawings and presentations, build models, and apply creative problem solving methods. Emphasis is placed on accessing and communicating information, using simple and complex tools in a safe manner, and increasing the students' awareness of the historical and contemporary implications of technology. Students are introduced to computer-aided graphics, design software, and computer-aided manufacturing. Students develop an understanding of the tools, techniques, and processes of technology using design principles, computers, problem solving and model making.

03.0 COMMUNICATION SYSTEMS I

Prerequisite: Fundamentals of Technology

Last Updated 07/03/01

Communication Systems I is designed to develop an understanding of contemporary communication principles and devices. Students develop graphic and electronic communication projects through the use of various media. Activities typically include engineering and technical concepts of sketching, drafting, screen printing, computer-assisted graphics, technical presentations, photography, audio and video production. Students learn to apply the elements of good design to communication products.

04.0 COMMUNICATION SYSTEMS II

Prerequisites: Fundamentals of Technology
Communication Systems I

Communication Systems II uses the skills and insights gained from Communication Systems I. Students develop detailed and integrated communication projects and concepts. Students produce a variety of technical presentations using telecommunications, computer applications, graphics, and photography. This course is designed for students planning to enter business, education, marketing, sales, and advertising or planning to major in science, engineering, or technical fields related to communications.

05.0 MANUFACTURING SYSTEMS I

Prerequisite: Fundamentals of Technology

Manufacturing Systems I is designed for students to study general concepts and principles of manufacturing systems. Working individually and in teams, students design products, develop and conduct market surveys, develop financial and personnel strategies, advertise, market, and produce products using contemporary manufacturing methods. Designed for students interested in product design, creative problem solving, creation of prototypes, computer-assisted design and manufacturing, basic entrepreneurial skills, and engineering concepts.

06.0 MANUFACTURING SYSTEMS II

Prerequisites: Fundamentals of Technology
Manufacturing Systems I

Manufacturing Systems II continues to build on the knowledge and skills gained from Manufacturing Systems I. Students pursue more detailed and integrated manufacturing and production projects. Students continue to use creative problem solving skills, design tools and processes, and apply manufacturing techniques with increasing sophistication. Projects are designed and produced using computer-assisted manufacturing applications, computer numerically-controlled machines and robotics. This course has been developed for students pursuing careers in manufacturing as a designer, drafter, industrial manager, technician or engineer.

07.0 CONSTRUCTION SYSTEMS I

Prerequisite: Fundamentals of Technology

Construction Systems I is designed to introduce classical and contemporary elements, principles and processes of structural systems. Architectural and engineering subjects are studied through research, design, project development and assessment. Students explore the relationship of materials, form, function, and culture of notable past and present structures through practical applications and modeling techniques.

Last Updated 07/03/01

08.0 CONSTRUCTION SYSTEMS II

Prerequisites: Fundamentals of Technology
Construction Systems I

Students of Construction Systems II continue their study of structural systems through research, developing solutions, creating designs, building models and critiquing their work. Working individually and as team members, students apply the skills and insights from the previous course to pursue progressively demanding concepts and relationships of structural systems. Students are given greater freedom to explore individual topics of interest within the area of structural systems.

09.0 POWER/ENERGY AND TRANSPORTATION SYSTEMS I

Prerequisite: Fundamentals of Technology

Students enrolled in this course will explore sources, storage, transportation, consumption, control, environmental impacts, and conservation of power, energy and transportation. Land, ground effects, water, air, space and intermodal transportation systems will be explored with practical activities emphasizing relevant scientific and engineering concepts. Activities include defining problems, designing prototypes, using computer-assisted applications, constructing models, and testing prototypes using appropriate tools such as wind tunnels and performance tests.

10.0 POWER/ENERGY AND TRANSPORTATION SYSTEMS II

Prerequisites: Fundamentals of Technology
Power/Energy and Transportation Systems I

Power/Energy and Transportation Systems II students will continue to build on their knowledge of transportation systems by experimenting with increasingly complex systems and concepts. Guidance, intermodal and urban transportation systems are explored. Students continue to seek solutions to problems through research and design, prototype development and experimentation. Students perform technological assessments on transportation topics of interest.

11.0 EMERGING TECHNOLOGY STUDIES

Prerequisite: Fundamentals of Technology

Emerging/Engineering Technology Studies provides an opportunity for students to research and experiment with a technology-related topic of their choice. Topics may be chosen using the knowledge, skills and insights gained from previous vocational and academic courses, or from the latest information available in professional journals, Internet databases, or professionals in the field. Students work on an individual or small group project under the guidance of a technology teacher with input and involvement from other vocational and/or academic teachers and adult mentors. Students investigate technological concepts and apply the tools of technology to better understand other fields of study. The topic of study must be approved by the teacher in accordance with local established guidelines and criteria. Examples of projects might include: extensive research on lasers, fiber topics; biotechnology experiments; production of a multimedia project dealing with an important social issue related to technology; an original technology-related multimedia production.

12.0 PRINCIPLES OF TECHNOLOGY I

Prerequisite: None

Principles of Technology I provides the student with an understanding of the principles and concepts of technology and the mathematics associated with them through hands-on experimentation. Technical instruction on force, work, rate, resistance, energy, and power provides students with an understanding of essential concepts found in science and technology. Abstract concepts and models are stressed through student experimentation and observation. Especially designed for students planning technical, engineering, or science related careers.

13.0 PRINCIPLES OF TECHNOLOGY II

Prerequisite: Principles of Technology I

Principles of Technology II is a continuation of the first level. It provides instruction and experimentation with force, transformers, momentum, waves and vibrations, energy convertors, transducers, radiation theory, optical systems and time constants. Students continue their hands-on activities with increasingly complex phenomena.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Exploring Technology

IDAHO CODE NUMBER: TE 1901

- 01.01 Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems, and materials.
- 01.02 Exhibit positive human relations and leadership skills (standard leadership skills task list).
- 01.03 Demonstrate computer application and literacy.
- 01.04 Apply basic skills in communications, mathematics and science appropriate to technological content and learning activities.
- 01.05 Utilize the systems approach in technology.
- 01.06 Demonstrate technological literacy.
- 01.07 Discuss individual interests and aptitudes as they relate to a career.
- 01.08 Demonstrate the use of technological systems in processing resources.
- 01.09 Discuss the outcomes of technology on society and the environment.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Exploring Technology

IDAHO CODE NUMBER: TE 1901

01.01 DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS--
The student will be able to:

1. Follow laboratory safety rules and procedures.
2. Demonstrate good housekeeping within total laboratory.
3. Conduct laboratory activities and equipment operations in a safe manner.
4. Exercise care and respect for all tools, equipment, and materials.
5. Identify color-coding safety standards.
6. Safely use hand tools and power equipment.
7. Explain fire prevention and safety precautions and practices for extinguishing fires.
8. Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

01.02 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS (STANDARD LEADERSHIP SKILLS TASK LIST)--
The student will be able to:

1. Work cooperatively with others.
2. Demonstrate ability to do individual and cooperative planning of an activity.

01.03 DEMONSTRATE COMPUTER APPLICATION AND LITERACY--
The student will be able to:

1. Define terms related to computer parts and usage.
2. List ways in which computers are used in technology.
3. Discuss advantages and disadvantages in the use of computers.
4. Demonstrate the application of a computer.

01.04 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--

The student will be able to:

1. Find, understand and apply information from a variety of sources, written and electronic to produce a technical report.
2. Apply proper grammar and spelling in Technology Lab assignments.
3. Properly use math and science concepts in lab activities, using all available resources.

01.05 UTILIZE THE SYSTEMS APPROACH IN TECHNOLOGY--

The student will be able to:

1. Identify and define four systems of Technology Education taught in Idaho technology Labs.
2. Complete a communications activity.
3. Take part in a manufacturing activity.
4. Take part in a construction activity.
5. Take part in a transportation assignment.
6. Define and apply Energy as it relates to Technology Education.
7. Define and apply Power as it relates to Technology Education.
8. Take part in an assignment using basic electronics/electricity theory.

01.06 DEMONSTRATE TECHNOLOGICAL LITERACY--

The student will be able to:

1. Outline major historical technological developments or events.
2. Identify recent advances in technology.
3. Explain problem-solving roles of technology.
4. Define and apply a system.
5. Define and apply a systems model.
6. Define Technology.

01.07 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--

The student will be able to:

1. Describe individual strengths and weaknesses.
2. Discuss individual interests related to a career.
3. Identify careers within specific areas of technology.
4. Explore a career within a specific area of interest.

01.08 DEMONSTRATE THE USE OF TECHNOLOGICAL SYSTEMS IN PROCESSING RESOURCES--

The student will be able to:

1. Define the term Resource.
2. Identify four types of materials conversion.
3. Identify the types, sources and conversions of energy.
4. Identify the steps in processing information.
5. Construct a product using the materials conversion processes.
6. Construct a product that converts energy.
7. Use a computer to process information.

01.09 DISCUSS THE OUTCOMES OF TECHNOLOGY ON SOCIETY AND THE ENVIRONMENT--

The student will be able to:

1. Discuss the outcomes of technology, now and in the future.
2. Discuss the impacts of technology on work, job opportunities, and careers.
3. Discuss how technology can solve and/or create problems.
4. Discuss expected and unexpected outcomes of technology.
5. Discuss desired and undesired outcomes of technology.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Fundamentals of Technology

IDAHO CODE NUMBER: TE 1905

- 02.01 Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems and materials.
- 02.02 Exhibit positive human relations and leadership skills (standard leadership skills task list).
- 02.03 Demonstrate computer application and literacy.
- 02.04 Integrate basic academic skills and concepts.
- 02.05 List requisites and employment opportunities for employment in today's and our future technological world.
- 02.06 Identify evolving technologies in our technological world.
- 02.07 Demonstrate and apply design/problem-solving processes.
- 02.08 Demonstrate basic knowledge of communications technology.
- 02.09 Demonstrate basic knowledge of transportation systems.
- 02.10 Demonstrate knowledge of robotics.
- 02.11 Demonstrate knowledge of power and energy.
- 02.12 Demonstrate basic knowledge of construction technology.
- 02.13 Demonstrate a basic knowledge of manufacturing technology.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Fundamentals of Technology

IDAHO CODE NUMBER: TE 1905

02.01 DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS AND MATERIALS--
The student will be able to:

1. Follow laboratory safety rules and procedures.
2. Demonstrate good housekeeping within total laboratory.
3. Conduct laboratory activities and equipment operations in a safe manner.
4. Exercise care and respect for all tools, equipment, and materials.
5. Identify color-coding safety standards.
6. Safely use hand tools and power equipment.
7. Explain fire prevention and safety precautions and practices for extinguishing fires.
8. Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

02.02 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS (STANDARD LEADERSHIP SKILLS TASK LIST)--
The student will be able to:

1. Work cooperatively with others.
2. Demonstrate ability to do individual and cooperative planning of an activity.

02.03 DEMONSTRATE COMPUTER APPLICATION AND LITERACY--
The student will be able to:

1. Define terms related to computer parts and usage.
2. List ways in which computers are used in technology.
3. Discuss advantages and disadvantages in the use of computers.
4. Demonstrate the application of a computer.

02.04 INTEGRATE BASIC ACADEMIC SKILLS AND CONCEPTS--
The student will be able to:

1. Find, understand, and apply information from a variety of sources, written and electronic, to produce a technical report.
2. Read and follow complex written instructions.

3. Answer and ask questions coherently and concisely, and follow spoken instructions.
4. Make and use measurements in both traditional and metric units.
5. Solve work-related problems involving basic arithmetic.

02.05 LIST REQUISITES AND EMPLOYMENT OPPORTUNITIES FOR EMPLOYMENT IN TODAY'S AND OUR FUTURE TECHNOLOGICAL WORLD--

The student will be able to:

1. List occupations, job requirements and employment opportunities in communications technology.
2. List occupations, job requirements and employment opportunities in construction technology.
3. List occupations, job requirements and employment opportunities in manufacturing technology.
4. List occupations, job requirements and employment opportunities in energy, power, and transportation technology.

02.06 IDENTIFY EVOLVING TECHNOLOGIES IN OUR TECHNOLOGICAL WORLD--

The student will be able to:

1. List evolving technologies.
2. Report on a recent or evolving technology.

02.07 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--

The student will be able to:

1. Describe and explain steps in the design/problem-solving process.
2. Propose solutions to given problems.
3. Design and implement the optimal solution to a given problem.

02.08 DEMONSTRATE BASIC KNOWLEDGE OF COMMUNICATIONS TECHNOLOGY--

The student will be able to:

1. Discuss the history of communications systems.
2. Identify and apply common terms and definitions associated with communications.
3. Discuss the use of computers in communications.
4. Demonstrate computer literacy through use and application of computers in communication systems.
5. Understand the use and function of telecommunication components.
6. Illustrate knowledge of graphic arts concepts.
7. Demonstrate knowledge of drafting/design concepts, manual and electronic.
8. Understand how information is exchanged between humans and machines.
9. Discuss the influences and effects of communications technology on society, culture and the environment.

02.09 DEMONSTRATE BASIC KNOWLEDGE OF TRANSPORTATION SYSTEMS--

The student will be able to:

1. Discuss the history of transportation (Systems/Future/Impacts).
2. Discuss and demonstrate Land Transportation (Systems/Future/Impacts).
3. Discuss and demonstrate Water Transportation (Systems/Future/Impacts).
4. Discuss and demonstrate Atmospheric Transportation (Systems/Future/Impacts).
5. Discuss and demonstrate Space Transportation (Systems/Future/Impacts).
6. Discuss the future of Transportation.

02.10 DEMONSTRATE KNOWLEDGE OF ROBOTICS--

The student will be able to:

1. Define the term "Robots".
2. Discuss uses of Robots.
3. Define common parts of a Robot.
4. Demonstrate/construct a Robot.

02.11 DEMONSTRATE KNOWLEDGE OF POWER AND ENERGY--

The student will be able to:

1. Identify Fossil Fuels and uses.
2. Define wind and water resources.
3. Demonstrate a wind or water resource.
4. Define/discuss Solar Energy.
5. Define/discuss Nuclear Energy resources.
6. Discuss Energy Conservation.
7. Demonstrate application of power/energy to technology systems.
8. Define/demonstrate basic electronic/electrical theory.

02.12 DEMONSTRATE BASIC KNOWLEDGE OF CONSTRUCTION TECHNOLOGY--

The student will be able to:

1. Apply blueprint reading skills.
2. Discuss/demonstrate basic construction concepts/techniques.
3. Identify construction materials and processes.
4. Discuss uses of new technology in construction.
5. Define basic construction vocabulary.
6. Discuss the future of construction.
7. Discuss the types of construction (land, space, and underwater).

02.13 DEMONSTRATE A BASIC KNOWLEDGE OF MANUFACTURING TECHNOLOGY--

The student will be able to:

1. Demonstrate the essential elements and organization of the free enterprise system.
2. Discuss the history of Manufacturing.
3. Identify types of Production Systems.
4. Demonstrate/define Research and Development.
5. Discuss financial aspects of Manufacturing.
6. Define Industrial Relations.
7. Define materials, material processing, material testing, and material recycling.
8. Discuss/explore traditional and innovative equipment.
9. Discuss/demonstrate the use of robotics/computers (CAM) in manufacturing.
10. Demonstrate the mass production process.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Communications Systems I

IDAHO CODE NUMBER: TE 1951

- 03.01 Demonstrate the ability to work safely with a variety of technologies.
- 03.02 Demonstrate interpersonal skills as they relate to the workplace.
- 03.03 Identify and apply methods of information acquisition and utilization.
- 03.04 Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.
- 03.05 Demonstrate and apply design/problem-solving processes.
- 03.06 Express an understanding of technological systems and their complex interrelationships.
- 03.07 Demonstrate the ability to properly identify, organize, plan, and allocate resources.
- 03.08 Discuss individual interests and aptitudes as they relate to a career.
- 03.09 Demonstrate employability skills and habits.
- 03.10 Demonstrate an understanding of entrepreneurship.
- 03.11 Make an informed and meaningful career choice.
- 03.12 Demonstrate technological literacy about communications systems.
- 03.13 Demonstrate knowledge and perform special skills unique to the information processing technologies.
- 03.14 Demonstrate knowledge and perform special skills unique to the graphic communication technologies.
- 03.15 Demonstrate knowledge and perform special skills unique to the electronic communication processing technologies.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Communications Systems I

IDAHO CODE NUMBER: TE 1951

03.01 DEMONSTRATE THE ABILITY TO WORK SAFELY WITH A VARIETY OF TECHNOLOGIES--

The student will be able to:

1. Select appropriate tools, procedures, and/or equipment needed to produce a product.
2. Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
3. Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.
4. Follow laboratory safety rules and procedures.
5. Demonstrate good housekeeping at work station within total laboratory.
6. Identify color-coding safety standards.
7. Explain fire prevention and safety precautions and practices for extinguishing fires.
8. Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

03.02 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--

The student will be able to:

1. Perform roles in a student personnel system or in the Idaho Technology Student Association (ID-TSA).
2. Participate as a member of a team.
3. Teach others new skills.
4. Identify skills needed to serve clients/customers.
5. Demonstrate leadership skills.
6. Describe strategies necessary for negotiating agreements.
7. Demonstrate the application of skills necessary to work with people of diverse backgrounds.
8. Form an understanding and appreciation for work after listening to or observing technology workers.
9. Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
10. Form an understanding and appreciation for the roles and work of co-workers.

03.03 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND UTILIZATION-

The student will be able to:

1. Define terms related to computers.
2. Identify and describe methods of information acquisition and evaluation.
3. Discuss advantages and disadvantages in the application of technologies.
4. Produce a plan to organize and maintain information relevant to emerging technologies.
5. Comprehend and communicate information relevant to emerging technologies.
6. Demonstrate the use of computers to process information.

03.04 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--

The student will be able to:

1. Identify and explain the main and subordinate ideas in a written work.
2. Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.
3. Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.
4. Distinguish fact from opinion.
5. Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.
6. Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.
7. Improve one's own writing by restructuring, correcting errors, and rewriting.
8. Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.
9. Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.
10. Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.
11. Compose unified and coherent correspondence, directions, descriptions, explanations and reports.
12. Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.
13. Conceive and develop ideas about a topic for the purpose of speaking to a group; choose and organize related ideas; present them clearly in Standard English; and evaluate similar presentations by others.

14. Use the mathematics of:
 - integers, fractions, and decimals;
 - ratios, proportions, and percentages;
 - roots and powers;
 - algebra;
 - geometry.
15. Make estimates and approximations, and judge the reasonableness of a result.
16. Use elementary concepts of probability and statistics.
17. Draw, read, and analyze graphs, charts, and tables.
18. Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and field work.
19. Organize and communicate the results obtained by observation and experimentation.
20. Apply the basic principles of biology, physics, and chemistry. (properties of matter; structure of compounds; concepts of motion; temperature, pressure and volume; work, power, force and energy; machines; human cell structure).
21. Identify problems rooted in basic biology, physics, or chemistry (effects of hazardous materials on health and safety, effects of drugs on health, trouble shooting problems on a machine).

03.05 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--

The student will be able to:

1. Describe and explain steps in the design/problem-solving process.
2. Propose solutions to given problems.
3. Design and implement the optimal solution to a given problem.
4. Document each step of the design/problem-solving process.
5. Demonstrate "Brainstorming" as a process to solve problems.
6. Define "critical thinking" and its value in the problem-solving process.

03.06 EXPRESS AN UNDERSTANDING OF TECHNOLOGICAL SYSTEMS AND THEIR COMPLEX INTERRELATIONSHIPS--

The student will be able to:

1. Demonstrate a knowledge of how social, organizational, and technological systems work.
2. Explore methods used to monitor and correct performance of technological systems.
3. Design and implement an optimal solution to a given problem.
4. Outline major historical technological developments or events.
5. Identify recent advances in technology.
6. Explain problem-solving roles of technology.
7. Forecast a technological development or event.
8. Define technology.

03.07 DEMONSTRATE THE ABILITY TO PROPERLY IDENTIFY, ORGANIZE, PLAN, AND ALLOCATE RESOURCES--

The student will be able to:

1. Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
2. Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
3. Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
4. Display a knowledge of the efficient use of human resources.

03.08 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--

The student will be able to:

1. Describe individual strengths and weaknesses.
2. Discuss individual interests related to a career.
3. Identify careers within specific areas of technology.
4. Explore careers within specific areas of interest.

03.09 DEMONSTRATE EMPLOYABILITY SKILLS AND HABITS--

The student will be able to:

1. Identify employment opportunities.
2. Apply employment seeking skills.
3. Interpret employment capabilities.
4. Demonstrate appropriate work behavior.
5. Maintain safe and healthy environment.
6. Maintain businesslike image.
7. Maintain working relationships with others.
8. Communicate on the job.
9. Adapt to change.
10. Demonstrate a knowledge of manufacturing.
11. Perform mathematical calculations.
12. Compile a portfolio.

03.10 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--

The student will be able to:

1. Define entrepreneurship.
2. Describe the importance of entrepreneurship to the American economy.
3. List the advantages and disadvantages of business ownership.
4. Identify the risks involved in ownership of a business.
5. Identify the necessary personal characteristics of a successful entrepreneur.
6. Identify the business skills needed to operate a small business efficiently and effectively.

03.11 MAKE AN INFORMED AND MEANINGFUL CAREER CHOICE--

The student will be able to:

1. Make a tentative occupational choice based on the information learned and interest developed in this course.
2. Review tentative occupational choices based on the information learned and interest developed in this course.

03.12 DEMONSTRATE TECHNOLOGICAL LITERACY ABOUT COMMUNICATIONS SYSTEMS--

The student will be able to:

1. Define communications technology.
2. Outline major technological developments and events in the history of communications systems technology.
3. Identify recent advances in communications technology.
4. Forecast a development or event in communications technology.

03.13 DEMONSTRATE KNOWLEDGE AND PERFORM SPECIAL SKILLS UNIQUE TO THE INFORMATION PROCESSING TECHNOLOGIES--

The student will be able to:

1. Define the function of information processing technology.
2. Describe three careers for information processing technology.
3. Identify and demonstrate the tools, processes and materials used in the information processing technology.
4. Demonstrate modern communication systems using sound and speech, symbols and codes, printed works, drawing and pictures.
5. Identify several telecommunication services.
6. Demonstrate problem-solving skills relative to the information processing technology.
7. Demonstrate the use of computer hardware and software relative to information processing technologies.

03.14 DEMONSTRATE KNOWLEDGE AND PERFORM SPECIAL SKILLS UNIQUE TO THE GRAPHIC COMMUNICATION TECHNOLOGIES--

The student will be able to:

1. Define the function of graphic communication technologies.
2. Describe three careers for graphic communication technologies.
3. Identify and demonstrate the tools, processes and materials used in graphic communication technology system.
4. Demonstrate modern communication systems using symbols and codes, printed works, drawing and pictures.
5. Demonstrate problem-solving skills relative to the graphic communication technologies.
6. Demonstrate the use of computer hardware and software relative to graphic communication technologies.

03.15 DEMONSTRATE KNOWLEDGE AND PERFORM SPECIAL SKILLS UNIQUE TO
THE ELECTRONIC COMMUNICATION PROCESSING TECHNOLOGIES--

The student will be able to:

1. Define the function of electronic communication technology.
2. Describe three careers for electronic communication technology.
3. Identify and demonstrate the tools, processes and materials used in electronic communication technology.
4. Compare and contrast different electronic communication technologies.
5. Demonstrate modern communication systems using sound and speech, symbols and codes, drawing and pictures.
6. Identify several telecommunication services.
7. Demonstrate problem-solving skills relative to electronic communication technologies.
8. Demonstrate the use of computer hardware and software relative to electronic communication technologies.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Communication Systems II

IDAHO CODE NUMBER: TE 1952

- 04.01 Demonstrate the ability to work safely with a variety of technologies.
- 04.02 Demonstrate interpersonal skills as they relate to the workplace.
- 04.03 Identify and apply methods of information acquisition and utilization.
- 04.04 Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.
- 04.05 Demonstrate and apply design/problem-solving processes.
- 04.06 Express an understanding of technological systems and their complex interrelationships.
- 04.07 Demonstrate the ability to properly identify, organize, plan, and allocate resources.
- 04.08 Discuss individual interests and aptitudes as they relate to a career.
- 04.09 Demonstrate employability skills and habits.
- 04.10 Demonstrate an understanding of entrepreneurship.
- 04.11 Make an informed and meaningful career choice.
- 04.12 Demonstrate verbal communication skills.
- 04.13 Demonstrate technical knowledge and skills relating to information processing technologies.
- 04.14 Demonstrate technical knowledge and skills relating to graphic communication technologies.
- 04.15 Demonstrate technical knowledge and skills relating to electronic communication technologies.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Communication Systems II

IDAHO CODE NUMBER: TE 1952

04.01 DEMONSTRATE THE ABILITY TO WORK SAFELY WITH A VARIETY OF TECHNOLOGIES--

The student will be able to:

1. Select appropriate tools, procedures, and/or equipment needed to produce a product.
2. Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
3. Demonstrate knowledge required to maintain and troubleshoot.
4. Follow laboratory safety rules and procedures.
5. Demonstrate good housekeeping at work state and within total laboratory.
6. Identify color-coding safety standards.
7. Explain fire prevention and safety precautions and practices for extinguishing fires.
8. Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

04.02 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--

The student will be able to:

1. Perform roles in a student personnel system or in the Idaho Technology Student Association (ID-TSA).
2. Participate as a member of a team.
3. Teach others new skills.
4. Identify skills needed to serve clients/customers.
5. Demonstrate leadership skills.
6. Describe strategies necessary for negotiating agreements.
7. Demonstrate the application of skills necessary to work with people of diverse backgrounds.
8. Form an understanding and appreciation for work after listening to or observing technology workers.
9. Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
10. Form an understanding and appreciation for the roles and work of co-workers.

04.03 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND UTILIZATION-

The student will be able to:

1. Define terms related to computers.
2. Identify and describe methods of information acquisition and evaluation.
3. Discuss advantages and disadvantages in the application of technologies.
4. Produce a plan to organize and maintain information relevant to emerging technologies.
5. Comprehend and communicate information relevant to emerging technologies.
6. Demonstrate the use of computers to process information.

04.04 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--

The student will be able to:

1. Use the features of books and reference materials, such as table of contents, preface, introduction, titles and subtitles, index, glossary, appendix, and bibliography.
2. Read and follow complex written directions.
3. Find, understand, and apply information from a variety of sources (books, manuals, newspapers, periodicals, directories, reference works, computer printouts, and other printed matter or electronic sources such as video display terminals).
4. Use and expand general and specialized vocabulary (including abbreviations, acronyms, and concepts) as appropriate to subject areas studied at the grade level.
5. Write Standard English sentences with correct:
 - sentence structure;
 - verb forms;
 - punctuation, capitalization, possessives, plural forms, and other matters of mechanics;
 - word choice and spelling.
6. Answer and ask questions coherently and concisely, and follow spoken instructions.
7. Identify and comprehend the main and subordinate ideas in lectures and discussions, ask questions to clarify information heard, and report accurately what others have said.
8. Perform with accuracy the computations of addition, subtraction, multiplication, and division using natural numbers, fractions, decimals, and integers.
9. Make and use measurements in both traditional and metric units.
10. Formulate and solve problems in mathematical terms, selecting appropriate approaches and tools (mental computation, trial and error, paper-and-pencil techniques, calculator, and computer).
11. Solve work-related problems involving the basic arithmetic operations using whole numbers, fractions, decimals, and percents.
12. Describe the role of observation and experimentation in the development of scientific theories.
13. Gather scientific information through skills in laboratory, field, and library work.
14. Draw conclusions or make inferences from data.

15. Apply basic scientific/technical solutions to the appropriate problems.

04.05 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--

The student will be able to:

1. Describe and explain steps in the design/problem-solving process.
2. Propose solutions to given problems.
3. Design and implement the optimal solution to a given problem.
4. Document each step of the design/problem-solving process.
5. Demonstrate "Brainstorming" as a process to solve problems.
6. Define "critical thinking" and its value in the problem-solving process.

04.06 EXPRESS AN UNDERSTANDING OF TECHNOLOGICAL SYSTEMS AND THEIR COMPLEX INTERRELATIONSHIPS--

The student will be able to:

1. Demonstrate a knowledge of how social, organizational, and technological systems work.
2. Explore methods used to monitor and correct performance of technological systems.
3. Design and implement an optimal solution to a given problem.
4. Outline major historical technological developments or events.
5. Identify recent advances in technology.
6. Explain problem-solving roles of technology.
7. Forecast a technological development or event.
8. Define technology.

04.07 DEMONSTRATE THE ABILITY TO PROPERLY IDENTIFY, ORGANIZE, PLAN, AND ALLOCATE RESOURCES--

The student will be able to:

1. Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
2. Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
3. Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
4. Display a knowledge of the efficient use of human resources.

04.08 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--

The student will be able to:

1. Describe individual strengths and weaknesses.
2. Discuss individual interests related to a career.
3. Identify careers within specific areas of technology.
4. Explore careers within specific areas of interest.

04.09 DEMONSTRATE EMPLOYABILITY SKILLS AND HABITS--

The student will be able to:

1. Identify employment opportunities.
2. Apply employment seeking skills.
3. Interpret employment capabilities.
4. Demonstrate appropriate work behavior.
5. Maintain safe and healthy environment.
6. Maintain businesslike image.
7. Maintain working relationships with others.
8. Communicate on the job.
9. Adapt to change.
10. Demonstrate a knowledge of manufacturing.
11. Perform mathematical calculations.
12. Compile a portfolio.

04.10 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--

The student will be able to:

1. Define entrepreneurship.
2. Describe the importance of entrepreneurship to the American economy.
3. List the advantages and disadvantages of business ownership.
4. Identify the risks involved in ownership of a business.
5. Identify the necessary personal characteristics of a successful entrepreneur.
6. Identify the business skills needed to operate a small business efficiently and effectively.

04.11 MAKE AN INFORMED AND MEANINGFUL CAREER CHOICE--

The student will be able to:

1. Make a tentative occupational choice based on the information learned and interest developed in this course.
2. Review tentative occupational choices based on the information learned and interest developed in this course.

04.12 DEMONSTRATE VERBAL COMMUNICATION SKILLS--

The student will be able to:

1. Demonstrate verbal communication skills by giving directions to another person.
2. Demonstrate verbal communications skills by listening to and following directions from another person.

04.13 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS RELATING TO INFORMATION PROCESSING TECHNOLOGIES--

The student will be able to:

1. Describe several information processing devices.
2. Chart the various processes involved in transmission of sound, video and data.
3. Demonstrate technical skills by processing information with a computer, peripherals and applications.

04.14 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS RELATING TO GRAPHIC COMMUNICATION TECHNOLOGIES--

The student will be able to:

1. Describe several graphic communication processes.
2. Create a multimedia presentation.
3. Demonstrate technical skills relating to graphic communications using a computer, peripherals and applications.
4. Demonstrate traditional drafting skills.
5. Demonstrate technical skills relating to continuous tone photography.
6. Describe the various printing processes used in industry.

04.15 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS RELATING TO ELECTRONIC COMMUNICATION TECHNOLOGIES--

The student will be able to:

1. Describe several electronic communications devices.
2. Chart the various electronic communication systems involved in transmission of sound, video and data.
3. Demonstrate technical skills of transmission and reception of electronic communications.
4. Send and receive data via a computer network.
5. Explore emerging technologies such as lasers, fiber optics, etc.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Manufacturing Systems I

IDAHO CODE NUMBER: TE 1931

- 05.01 Demonstrate the ability to work safely with a variety of technologies.
- 05.02 Demonstrate interpersonal skills as they relate to the workplace.
- 05.03 Identify and apply methods of information acquisition and utilization.
- 05.04 Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.
- 05.05 Demonstrate and apply design/problem-solving processes.
- 05.06 Express an understanding of technological systems and their complex interrelationships.
- 05.07 Demonstrate the ability to properly identify, organize, plan, and allocate resources.
- 05.08 Discuss individual interests and aptitudes as they relate to a career.
- 05.09 Demonstrate employability skills and habits.
- 05.10 Demonstrate an understanding of entrepreneurship.
- 05.11 Make an informed and meaningful career choice.
- 05.12 Demonstrate technological literacy about manufacturing systems.
- 05.13 Demonstrate knowledge of the advancement and history in manufacturing.
- 05.14 Describe types of organization, ownership and management systems.
- 05.15 Describe types of production systems.
- 05.16 Demonstrate knowledge of research and development techniques.
- 05.17 Demonstrate knowledge of financial aspects.
- 05.18 Demonstrate knowledge of industrial relations.
- 05.19 Demonstrate knowledge of characteristics of various materials and natural resources used in manufacturing.

Last Updated 07/03/01

- 05.20 Demonstrate use of traditional and innovative equipment.
- 05.21 Demonstrate knowledge of material processing and recycling.
- 05.22 Demonstrate procedures of converting energy.
- 05.23 Demonstrate knowledge of production planning.
- 05.24 Demonstrate marketing techniques.
- 05.25 Demonstrate knowledge of free enterprise systems.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Manufacturing Systems I

IDAHO CODE NUMBER: TE 1931

05.01 DEMONSTRATE THE ABILITY TO WORK SAFELY WITH A VARIETY OF TECHNOLOGIES--

The student will be able to:

1. Select appropriate tools, procedures, and/or equipment needed to produce a product.
2. Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
3. Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.
4. Follow laboratory safety rules and procedures.
5. Demonstrate good housekeeping at work station within total laboratory.
6. Identify color-coding safety standards.
7. Explain fire prevention and safety precautions and practices for extinguishing fires.
8. Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

05.02 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--

The student will be able to:

1. Perform roles in a student personnel system or in the Idaho Technology Student Association (ID-TSA).
2. Participate as a member of a team.
3. Teach others new skills.
4. Identify skills needed to serve clients/customers.
5. Demonstrate leadership skills.
6. Describe strategies necessary for negotiating agreements.
7. Demonstrate the application of skills necessary to work with people of diverse backgrounds.
8. Form an understanding and appreciation for work after listening to or observing technology workers.
9. Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
10. Form an understanding and appreciation for the roles and work of co-workers.

05.03 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND UTILIZATION-

The student will be able to:

1. Define terms related to computers.
2. Identify and describe methods of information acquisition and evaluation.
3. Discuss advantages and disadvantages in the application of technologies.
4. Produce a plan to organize and maintain information relevant to emerging technologies.
5. Comprehend and communicate information relevant to emerging technologies.
6. Demonstrate the use of computers to process information.

05.04 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE
APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--

The student will be able to:

1. Identify and explain the main and subordinate ideas in a written work.
2. Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.
3. Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.
4. Distinguish fact from opinion.
5. Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.
6. Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.
7. Improve one's own writing by restructuring, correcting errors, and rewriting.
8. Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.
9. Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.
10. Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.
11. Compose unified and coherent correspondence, directions, descriptions, explanations and reports.
12. Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.
13. Conceive and develop ideas about a topic for the purpose of speaking to a group; choose and organize related ideas; present them clearly in Standard English; and evaluate similar presentations by others.
14. Use the mathematics of:
 - integers, fractions, and decimals;
 - ratios, proportions, and percentages;
 - roots and powers;
 - algebra;
 - geometry.
15. Make estimates and approximations, and judge the reasonableness of a result.

16. Use elementary concepts of probability and statistics.
17. Draw, read, and analyze graphs, charts, and tables.
18. Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and field work.
19. Organize and communicate the results obtained by observation and experimentation.
20. Apply the basic principles of biology, physics, and chemistry. (properties of matter; structure of compounds; concepts of motion; temperature, pressure and volume; work, power, force and energy; machines; human cell structure).
21. Identify problems rooted in basic biology, physics, or chemistry (effects of hazardous materials on health and safety, effects of drugs on health, trouble shooting problems on a machine).

05.05 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--

The student will be able to:

1. Describe and explain steps in the design/problem-solving process.
2. Propose solutions to given problems.
3. Design and implement the optimal solution to a given problem.
4. Document each step of the design/problem-solving process.
5. Demonstrate "Brainstorming" as a process to solve problems.
6. Define "critical thinking" and its value in the problem-solving process.

05.06 EXPRESS AN UNDERSTANDING OF TECHNOLOGICAL SYSTEMS AND THEIR COMPLEX INTERRELATIONSHIPS--

The student will be able to:

1. Demonstrate a knowledge of how social, organizational, and technological systems work.
2. Explore methods used to monitor and correct performance of technological systems.
3. Design and implement an optimal solution to a given problem.
4. Outline major historical technological developments or events.
5. Identify recent advances in technology.
6. Explain problem-solving roles of technology.
7. Forecast a technological development or event.
8. Define technology.

05.07 DEMONSTRATE THE ABILITY TO PROPERLY IDENTIFY, ORGANIZE, PLAN, AND ALLOCATE RESOURCES--

The student will be able to:

1. Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
2. Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
3. Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.

4. Display a knowledge of the efficient use of human resources.

05.08 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--

The student will be able to:

1. Describe individual strengths and weaknesses.
2. Discuss individual interests related to a career.
3. Identify careers within specific areas of technology.
4. Explore careers within specific areas of interest.

05.09 DEMONSTRATE EMPLOYABILITY SKILLS AND HABITS--

The student will be able to:

1. Identify employment opportunities.
2. Apply employment seeking skills.
3. Interpret employment capabilities.
4. Demonstrate appropriate work behavior.
5. Maintain safe and healthy environment.
6. Maintain businesslike image.
7. Maintain working relationships with others.
8. Communicate on the job.
9. Adapt to change.
10. Demonstrate a knowledge of manufacturing.
11. Perform mathematical calculations.
12. Compile a portfolio.

05.10 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--

The student will be able to:

1. Define entrepreneurship.
2. Describe the importance of entrepreneurship to the American economy.
3. List the advantages and disadvantages of business ownership.
4. Identify the risks involved in ownership of a business.
5. Identify the necessary personal characteristics of a successful entrepreneur.
6. Identify the business skills needed to operate a small business efficiently and effectively.

05.11 MAKE AN INFORMED AND MEANINGFUL CAREER CHOICE--

The student will be able to:

1. Make a tentative occupational choice based on the information learned and interest developed in this course.
2. Review tentative occupational choices based on the information learned and interest developed in this course.

05.12 DEMONSTRATE TECHNOLOGICAL LITERACY ABOUT MANUFACTURING SYSTEMS--

The student will be able to:

1. Define manufacturing technology.
2. Outline major technological developments and events in the history of manufacturing systems technology.
3. Identify recent advances in manufacturing technology.
4. Forecast a development or event in manufacturing technology.

05.13 DEMONSTRATE KNOWLEDGE OF THE ADVANCEMENT AND HISTORY IN MANUFACTURING--

The student will be able to:

1. Illustrate and recall the history of the home handicraft system, era.
2. Analyze the history and events of the mercantile system.
3. Report, employ and test various machines that are used in the manufacturing systems.
4. Demonstrate, experiment and construct various mass production sequences.
5. Recognize and demonstrate different types of factory systems.
6. Research, employ, diagram, prepare and assess different assembly line techniques.
7. Explain, operate and propose the advantages and disadvantages of computers and automation in manufacturing production systems.

05.14 DESCRIBE TYPES OF ORGANIZATION, OWNERSHIP AND MANAGEMENT SYSTEMS--

The student will be able to:

1. Identify, practice and compare the business and manufacturing aspects of sole proprietorship.
2. Define, discuss, apply and examine the functions of partnerships.

05.15 DESCRIBE TYPES OF PRODUCTION SYSTEMS--

The student will be able to:

1. Dramatize, compare and design a custom manufacturing system.
2. Identify, employ and create an intermittent manufacturing system.
3. Demonstrate, appraise and manage a continuous manufacturing system.

05.16 DEMONSTRATE KNOWLEDGE OF RESEARCH AND DEVELOPMENT TECHNIQUES--

The student will be able to:

1. Discuss and demonstrate the steps in problem solving.
2. Relate, review, apply and test techniques used in basic research.
3. Define, discuss, interpret and arrange the principles demonstrated in applied research.

05.17 DEMONSTRATE KNOWLEDGE OF FINANCIAL ASPECTS--

The student will be able to:

1. Identify, analyze and organize the various aspects needed for capital resources.
2. Illustrate and practice the accounting techniques used in manufacturing.
3. Employ and plan the procedures involved in the purchasing aspects of manufacturing.
4. Analyze, collect and evaluate data researched and collected from marketing practices applied in manufacturing.

05.18 DEMONSTRATE KNOWLEDGE OF INDUSTRIAL RELATIONS--

The student will be able to:

1. Relate, report and dramatize the different situations involved in industrial relationships.
2. List, explain and compose the various facets of employee relations in a manufacturing enterprise.
3. Define, express and set up the different situations involved in public relations with their customers.

05.19 DEMONSTRATE KNOWLEDGE OF CHARACTERISTICS OF VARIOUS MATERIALS AND NATURAL RESOURCES USED IN MANUFACTURING--

The student will be able to:

1. Describe the science of materials, including their properties.
2. Define, discuss, apply, experiment, create and appraise the various methods of operation and uses for woods, metals, plastics, composites, biotechnology and natural resources.

05.20 DEMONSTRATE USE OF TRADITIONAL AND INNOVATIVE EQUIPMENT--

The student will be able to:

1. Identify and describe tools used in the manufacturing process.
2. Identify and describe the six basic machines used in manufacturing.
3. Demonstrate the safe operation of selected machines used in the manufacturing lab.

05.21 DEMONSTRATE KNOWLEDGE OF MATERIAL PROCESSING AND RECYCLING--

The student will be able to:

1. Define, identify and illustrate the three basic processes in material processing.
2. Illustrate the proper practice and tests for thermal forming, magnetic forming, chemical forming and natural forming.
3. Demonstrate the proper practice and experiments for mechanical separating, chemical separating and electrical separating.
4. Employ the proper practice and experiments for mechanical combining, electrical combining, chemical combining, alloys and composites.

05.22 DEMONSTRATE PROCEDURES OF CONVERTING ENERGY--

The student will be able to:

1. Identify, apply and test methods of converting electrical energy (hydro, chemical, innovative methods...etc.).
2. Recognize, employ and experiment with methods of converting mechanical energy (steam, internal combustion engine, innovative methods...etc.).
3. Describe, illustrate and test methods of converting chemical energy (coal, batteries, petroleum, natural gas, innovative methods...etc.).

05.23 DEMONSTRATE KNOWLEDGE OF PRODUCTION PLANNING--

The student will be able to:

1. Define and assess steps in production planning in specific areas of market analysis, research and development, organizational structures, production, distribution and customer relation/product evaluation.
2. Describe the quality control engineering processes.

05.24 DEMONSTRATE MARKETING TECHNIQUES--

The student will be able to:

1. Recall, report, practice and create proper techniques and strategies that will benefit their student manufacturing organization in creating and analyzing market demand, competition, market performance, consumer and market surveys.
2. Describe advertising methods.
3. Describe sales techniques.
4. Describe packaging procedures.
5. Describe shipping procedures associated with marketing products.

05.25 DEMONSTRATE KNOWLEDGE OF FREE ENTERPRISE SYSTEMS--

The student will be able to:

1. Explain, compare and evaluate the types of free enterprise systems.
2. Explaining the advantages and disadvantages of the common economic systems.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Manufacturing Systems II

IDAHO CODE NUMBER: TE 1932

- 06.01 Describe the types of manufacturing systems.
- 06.02 Discuss the implications of people: The most important resource.
- 06.03 Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.
- 06.04 Demonstrate knowledge of manufacturing materials.
- 06.05 Demonstrate knowledge of prototype design engineering processes.
- 06.06 Demonstrate knowledge of tools and machines used in manufacturing systems.
- 06.07 Demonstrate knowledge of the finances of manufacturing.
- 06.08 Demonstrate knowledge of production engineering processes.
- 06.09 Demonstrate knowledge of organization, ownership and management systems.
- 06.10 Demonstrate knowledge of processing materials.
- 06.11 Demonstrate knowledge of marketing processes.
- 06.12 Demonstrate knowledge of financial processes.
- 06.13 Demonstrate knowledge of manufactured goods.
- 06.14 Discuss the relationship of scrap, waste, pollution and recyclability.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Manufacturing Systems II

IDAHO CODE NUMBER: TE 1932

06.01 DESCRIBE THE TYPES OF MANUFACTURING SYSTEMS--

The student will be able to:

1. Distinguish between the various manufacturing systems.
2. Select which system is appropriate for a specific product.
3. Demonstrate, appraise and manage a continuous manufacturing system.

06.02 DISCUSS THE IMPLICATIONS OF PEOPLE: THE MOST IMPORTANT RESOURCE--

The student will be able to:

1. Explain why people are the most important resource in a manufacturing system.
2. Identify guidelines for the hiring of people for manufacturing.
3. Describe methods of protecting people in the manufacturing workplace.
4. Design and complete a job-application-form for a specific job within a manufacturing system.

06.03 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE
APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--

The student will be able to:

1. Use the features of books and reference materials, such as table of contents, preface, introduction, titles and subtitles, index, glossary, appendix, and bibliography.
2. Read and follow complex written directions.
3. Find, understand, and apply information from a variety of sources (books, manuals, newspapers, periodicals, directories, reference works, computer printouts, and other printed matter or electronic sources such as video display terminals).
4. Use and expand general and specialized vocabulary (including abbreviations, acronyms, and concepts) as appropriate to subject areas studied at the grade level.
5. Write Standard English sentences with correct:
 - sentence structure;
 - verb forms;
 - punctuation, capitalization, possessives, plural forms, and other matters of mechanics;
 - word choice and spelling.
6. Answer and ask questions coherently and concisely, and follow spoken instructions.

7. Identify and comprehend the main and subordinate ideas in lectures and discussions, ask questions to clarify information heard, and report accurately what others have said.
8. Perform with accuracy the computations of addition, subtraction, multiplication, and division using natural numbers, fractions, decimals, and integers.
9. Make and use measurements in both traditional and metric units.
10. Formulate and solve problems in mathematical terms, selecting appropriate approaches and tools (mental computation, trial and error, paper-and-pencil techniques, calculator, and computer).
11. Solve work-related problems involving the basic arithmetic operations using whole numbers, fractions, decimals, and percents.
12. Describe the role of observation and experimentation in the development of scientific theories.
13. Gather scientific information through skills in laboratory, field, and library work.
14. Draw conclusions or make inferences from data.
15. Apply basic scientific/technical solutions to the appropriate problems.

06.04 DEMONSTRATE KNOWLEDGE OF MANUFACTURING MATERIALS--

The student will be able to:

1. Define and identify 5 basic manufacturing materials.
2. Describe the primary manufacturing process involved in the production of a common raw material to the completed product.
3. Evaluate the mechanical, chemical, thermal and electrical properties of a selected material.
4. Distinguish between the classifications of metallic, ferrous, nonferrous, polymeric, ceramic and composite materials.

06.05 DEMONSTRATE KNOWLEDGE OF PROTOTYPE DESIGN ENGINEERING PROCESSES--

The student will be able to:

1. Demonstrate the research and development process.
2. Describe the six stages in the design engineering process.
3. Defend the importance of working drawings in the manufacturing process.
4. Demonstrate the advantages of using computer aided drafting in the design stages of a product.
5. Design a mass production project for a class prototype.

06.06 DEMONSTRATE KNOWLEDGE OF TOOLS AND MACHINES USED IN MANUFACTURING SYSTEMS--

The student will be able to:

1. Demonstrate the proper use and practice of machines and tools used in a traditional manufacturing process (partial example - drill press, table saw, engine lathe, CNC, micrometer, caliper, scales and ruler).
2. Demonstrate the proper use and application of machines and tools used in an innovative manufacturing process (partial example - robotics, CAM, CIM, plasma, water jet, laser, sonic, fiber, optic, pneumatic and hydraulic).

06.07 DEMONSTRATE KNOWLEDGE OF THE FINANCES OF MANUFACTURING--

The student will be able to:

1. Conduct a market research on a given product.
2. Describe what is meant by "It takes money to make money".
3. List various methods of acquiring money for a manufacturing company.
4. Describe various costs associated with a manufacturing company.

06.08 DEMONSTRATE KNOWLEDGE OF PRODUCTION ENGINEERING PROCESSES--

The student will be able to:

1. Illustrate the three production processes of methods, manufacturing and quality control engineering.
2. Identify the importance of operations process charts, flow process charts and operations sheets.
3. Recognize the importance of tooling.
4. Operate and identify various gages used in the quality inspection process.
5. Define the terms "tooling up, pilot run, bottle neck and debugging".

06.09 DEMONSTRATE KNOWLEDGE OF ORGANIZATION, OWNERSHIP AND MANAGEMENT SYSTEMS--

The student will be able to:

1. Analyze the advantages and disadvantages of the five different types of ownership.
2. Explain the organization of a basic corporation and the expanding role of corporations worldwide.
3. List the four primary jobs of managers.
4. Identify the importance of the concepts behind total quality control in manufacturing.
5. Set up a corporation to sell a class project.

06.10 DEMONSTRATE KNOWLEDGE OF PROCESSING MATERIALS--

The student will be able to:

1. Demonstrate form-changing processes of materials.
2. Distinguish between primary and secondary production form-changing processes in the manufacturing system.
3. Analyze and demonstrate the difference between materials-forming, separating and combining processes.
4. Demonstrate materials testing techniques.

06.11 DEMONSTRATE KNOWLEDGE OF MARKETING PROCESSES--

The student will be able to:

1. Illustrate that marketing research as an input that helps to determine demand for a product.
2. Describe the characteristics of the consumer and industrial goods markets.
3. Identify the functions of marketing, including product planning, advertising, sales and product service.
4. Analyze the problems (ethics) related to marketing techniques.

06.12 DEMONSTRATE KNOWLEDGE OF FINANCIAL PROCESSES--

The student will be able to:

1. Interpret various methods of calculating a break-even analysis for a manufactured product.
2. Demonstrate the basic steps involved in keeping track of financial activities with a general ledger.
3. Illustrate the process of calculating payroll and the various payroll deductions.
4. List the components of a balance sheet for a manufacturing company.
5. Apply the means of reporting manufacturing profits and calculating dividends with an income statement.

06.13 DEMONSTRATE KNOWLEDGE OF MANUFACTURED GOODS--

The student will be able to:

1. Analyze why the availability of manufactured goods is one of the variables that determine standard of living.
2. Classify consumer goods as durable or nondurable.
3. Recognize the impact of goods on quality and length of human life.
4. Define the impacts and consequences of military goods, both conventional and nuclear.

06.14 DISCUSS THE RELATIONSHIP OF SCRAP, WASTE, POLLUTION AND RECYCLABILITY--

The student will be able to:

1. Describe how mass production is followed by mass consumption, which is usually followed by mass scrap, waste, pollution and recyclability.
2. Explain why scrap is an output for one manufacturer and an input for another.
3. Identify pollution as a direct and indirect output of manufacturing.
4. Describe major air pollutants.
5. Report on groundwater contamination and toxic waste chemicals.
6. Identify the difficulties associated with solving non-point source pollution problems.
7. Illustrate the modern historical shift from air and water disposal to land disposal of toxic waste chemicals.
8. Evaluate products for appropriate use of materials.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Construction Systems I

IDAHO CODE NUMBER: TE 1920

- 07.01 Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems, and materials.
- 07.02 Demonstrate interpersonal skills as they relate to the workplace.
- 07.03 Identify and apply methods of information acquisition and utilization.
- 07.04 Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.
- 07.05 Demonstrate and apply design/problem-solving processes.
- 07.06 Express an understanding of technological systems and their complex interrelationships.
- 07.07 Demonstrate the ability to properly identify, organize, plan, and allocate resources.
- 07.08 Discuss individual interests and aptitudes as they relate to a career.
- 07.09 Demonstrate employability skills and habits.
- 07.10 Demonstrate an understanding of entrepreneurship.
- 07.11 Make an informed and meaningful career choice.
- 07.12 Demonstrate technological literacy about construction systems.
- 07.13 Exhibit positive human relations and leadership skills.
- 07.14 Demonstrate computer application and literacy.
- 07.15 Demonstrate and apply design/problem-solving processes.
- 07.16 Demonstrate technological literacy.
- 07.17 Display an understanding and appreciation for the dignity and worth of honest labor.
- 07.18 Discuss individual interests and aptitudes as they relate to a career.
- 07.19 Demonstrate evolving construction technologies.

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- 07.20 Perform special skills unique to construction technology.
- 07.21 Express a knowledge of factors that impact on construction technology and practices.
- 07.22 List requisites and career opportunities for employment in construction technology.
- 07.23 Demonstrate work common to residential, commercial and civil construction technology.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Construction Systems I

IDAHO CODE NUMBER: TE 1920

07.01 DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS --

The student will be able to:

1. Follow laboratory safety rules and procedures.
2. Demonstrate good housekeeping at work station within total laboratory.
3. Conduct laboratory activities and equipment operations in a safe manner.
4. Exercise care and respect for all tools, equipment, and materials.
5. Identify color-coding safety standards.
6. Safely use hand tools and power equipment.
7. Explain fire prevention and safety precautions and practices for extinguishing fires.
8. Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

07.02 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--

The student will be able to:

1. Perform roles in a student personnel system or in the Idaho Technology Student Association (ID-TSA).
2. Participate as a member of a team.
3. Teach others new skills.
4. Identify skills needed to serve clients/customers.
5. Demonstrate leadership skills.
6. Describe strategies necessary for negotiating agreements.
7. Demonstrate the application of skills necessary to work with people of diverse backgrounds.
8. Form an understanding and appreciation for work after listening to or observing technology workers.
9. Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
10. Form an understanding and appreciation for the roles and work of co-workers.

07.03 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND UTILIZATION-

The student will be able to:

1. Define terms related to computers.
2. Identify and describe methods of information acquisition and evaluation.
3. Discuss advantages and disadvantages in the application of technologies.
4. Produce a plan to organize and maintain information relevant to emerging technologies.
5. Comprehend and communicate information relevant to emerging technologies.
6. Demonstrate the use of computers to process information.

07.04 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--

The student will be able to:

1. Identify and explain the main and subordinate ideas in a written work.
2. Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.
3. Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.
4. Distinguish fact from opinion.
5. Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.
6. Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.
7. Improve one's own writing by restructuring, correcting errors, and rewriting.
8. Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.
9. Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.
10. Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.
11. Compose unified and coherent correspondence, directions, descriptions, explanations and reports.
12. Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.
13. Conceive and develop ideas about a topic for the purpose of speaking to a group; choose and organize related ideas; present them clearly in Standard English; and evaluate similar presentations by others.
14. Use the mathematics of:
 - integers, fractions, and decimals;
 - ratios, proportions, and percentages;
 - roots and powers;
 - algebra;
 - geometry.
15. Make estimates and approximations, and judge the reasonableness of a result.
16. Use elementary concepts of probability and statistics.

17. Draw, read, and analyze graphs, charts, and tables.

18. Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and field work.
19. Organize and communicate the results obtained by observation and experimentation.
20. Apply the basic principles of biology, physics, and chemistry. (properties of matter; structure of compounds; concepts of motion; temperature, pressure and volume; work, power, force and energy; machines; human cell structure).
21. Identify problems rooted in basic biology, physics, or chemistry (effects of hazardous materials on health and safety, effects of drugs on health, trouble shooting problems on a machine).

07.05 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--

The student will be able to:

1. Describe and explain steps in the design/problem-solving process.
2. Propose solutions to given problems.
3. Design and implement the optimal solution to a given problem.
4. Document each step of the design/problem-solving process.
5. Demonstrate "Brainstorming" as a process to solve problems.
6. Define "critical thinking" and its value in the problem-solving process.

07.06 EXPRESS AN UNDERSTANDING OF TECHNOLOGICAL SYSTEMS AND THEIR COMPLEX INTERRELATIONSHIPS--

The student will be able to:

1. Demonstrate a knowledge of how social, organizational, and technological systems work.
2. Explore methods used to monitor and correct performance of technological systems.
3. Design and implement an optimal solution to a given problem.
4. Outline major historical technological developments or events.
5. Identify recent advances in technology.
6. Explain problem-solving roles of technology.
7. Forecast a technological development or event.
8. Define technology.

07.07 DEMONSTRATE THE ABILITY TO PROPERLY IDENTIFY, ORGANIZE, PLAN, AND ALLOCATE RESOURCES--

The student will be able to:

1. Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
2. Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
3. Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
4. Display a knowledge of the efficient use of human resources.

07.08 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--

The student will be able to:

1. Describe individual strengths and weaknesses.
2. Discuss individual interests related to a career.
3. Identify careers within specific areas of technology.
4. Explore careers within specific areas of interest.

07.09 DEMONSTRATE EMPLOYABILITY SKILLS AND HABITS--

The student will be able to:

1. Identify employment opportunities.
2. Apply employment seeking skills.
3. Interpret employment capabilities.
4. Demonstrate appropriate work behavior.
5. Maintain safe and healthy environment.
6. Maintain businesslike image.
7. Maintain working relationships with others.
8. Communicate on the job.
9. Adapt to change.
10. Demonstrate a knowledge of manufacturing.
11. Perform mathematical calculations.
12. Compile a portfolio.

07.10 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--

The student will be able to:

1. Define entrepreneurship.
2. Describe the importance of entrepreneurship to the American economy.
3. List the advantages and disadvantages of business ownership.
4. Identify the risks involved in ownership of a business.
5. Identify the necessary personal characteristics of a successful entrepreneur.
6. Identify the business skills needed to operate a small business efficiently and effectively.

07.11 MAKE AN INFORMED AND MEANINGFUL CAREER CHOICE--

The student will be able to:

1. Make a tentative occupational choice based on the information learned and interest developed in this course.
2. Review tentative occupational choices based on the information learned and interest developed in this course.

07.12 DEMONSTRATE TECHNOLOGICAL LITERACY ABOUT CONSTRUCTION SYSTEMS--

The student will be able to:

1. Define construction technology.
2. Outline major technological developments and events in the history of construction systems technology.
3. Identify recent advances in construction technology.
4. Forecast a development or event in construction technology.

07.13 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--

The student will be able to:

1. Perform roles in a student personnel system or in the Idaho Technology Student Association (ID-TSA).
2. Work cooperatively with others.

07.14 DEMONSTRATE COMPUTER APPLICATION AND LITERACY--

The student will be able to:

1. Define terms related to computer parts and usage.
2. List ways in which computers are used in technology.
3. Discuss advantages and disadvantages in the use of computers.
4. Demonstrate the application of a computer.

07.15 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--

The student will be able to:

1. Describe and explain steps in the design/problem-solving process.
2. Propose solutions to given problems.
3. Design and implement the optimal solution to a given problem.

07.16 DEMONSTRATE TECHNOLOGICAL LITERACY--

The student will be able to:

1. Outline major historical technological developments or events.
2. Identify recent advances in technology.
3. Explain problem-solving roles of technology.
4. Forecast a technological decision.
5. Make a technological decision.
6. Define technology.

07.17 DISPLAY AN UNDERSTANDING AND APPRECIATION FOR THE DIGNITY AND WORTH OF HONEST LABOR--

The student will be able to:

1. Form an understanding and appreciation for work after listening to or observing technology workers.
2. Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

3. Form an understanding and appreciation for the roles and work of co-workers.

07.18 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--

The student will be able to:

1. Describe individual strengths and weaknesses.
2. Discuss individual interests related to a career.
3. Identify careers within specific areas of technology.
4. Explore careers within specific areas of interest.

07.19 DEMONSTRATE EVOLVING CONSTRUCTION TECHNOLOGIES--

The student will be able to:

1. List evolving technologies in construction.
2. Demonstrate evolving technology in construction, i.e. 1) modular, 2) geodesic dome, 3) manufactured, 4) non-combustible.

07.20 PERFORM SPECIAL SKILLS UNIQUE TO CONSTRUCTION TECHNOLOGY--

The student will be able to:

1. Interpret construction plans and blueprints.
2. Identify construction materials.
3. Apply carpentry skills.
4. Apply plumbing skills.
5. Apply electrical wiring skills.
6. Apply masonry skills.
7. Describe or demonstrate the construction skills of plastering, roofing, and finishing.

07.21 EXPRESS A KNOWLEDGE OF FACTORS THAT IMPACT ON CONSTRUCTION TECHNOLOGY AND PRACTICES--

The student will be able to:

1. Explain economic factors that impact on construction technology.
2. Research and identify types and styles of construction desired by consumers.
3. List sources of raw materials and standard stock materials available to construction technology.
4. Express a knowledge of construction technology labor organizations and hiring practices.

07.22 LIST REQUISITES AND CAREER OPPORTUNITIES FOR EMPLOYMENT IN CONSTRUCTION TECHNOLOGY--

The student will be able to:

1. List occupations, job requirements, and employment opportunities in construction technology.
2. List occupational training programs and academic programs and academic programs at the postsecondary levels in construction technologies.

07.23 DEMONSTRATE WORK COMMON TO RESIDENTIAL, COMMERCIAL AND CIVIL
CONSTRUCTION TECHNOLOGY--

The student will be able to:

1. Identify kinds of work related to construction technologies.
2. Demonstrate semi-skilled, skilled, and professional levels of work in construction technology.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Construction Systems II

IDAHO CODE NUMBER: TE 1921

- 08.01 Demonstrate the ability to work safely with a variety of technologies.
- 08.02 Demonstrate interpersonal skills as they relate to the workplace.
- 08.03 Identify and apply methods of information acquisition and utilization.
- 08.04 Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.
- 08.05 Demonstrate and apply design/problem-solving processes.
- 08.06 Express an understanding of technological systems and their complex interrelationships.
- 08.07 Demonstrate the ability to properly identify, organize, plan, and allocate resources.
- 08.08 Discuss individual interests and aptitudes as they relate to a career choice.
- 08.09 Demonstrate employability skills and habits.
- 08.10 Demonstrate an understanding of entrepreneurship.
- 08.11 Apply advanced technical knowledge and skills about construction technology.
- 08.12 Demonstrate technical knowledge and skills about selecting and preparing a construction site.
- 08.13 Demonstrate technical knowledge and skills about designing and engineering constructed works.
- 08.14 Demonstrate technical knowledge and skills about contracting, estimating, bidding, and scheduling.
- 08.15 Demonstrate technical knowledge and skills about constructing substructures.
- 08.16 Demonstrate technical knowledge and skills about constructing superstructures.
- 08.17 Demonstrate technical knowledge and skills about installing utilities.

Last Updated 07/03/01

- 08.18 Demonstrate technical knowledge and skills about enclosing superstructures.
- 08.19 Demonstrate technical knowledge and skills about interior and exterior finishing of a constructed structure.
- 08.20 Perform advanced study and technical skills related to construction technology.
- 08.21 Operate a computer utilizing a program related to construction technology.
- 08.22 Demonstrate technical knowledge and skills about regional planning and the construction of civil or community structures.
- 08.23 Conduct structural tests on constructed structures and construction materials.
- 08.24 Conduct a research and experimentation project on a construction technology process or material.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Construction Systems II

IDAHO CODE NUMBER: TE 1921

08.01 DEMONSTRATE THE ABILITY TO WORK SAFELY WITH A VARIETY OF TECHNOLOGIES--

The student will be able to:

1. Select appropriate tools, procedures, and/or equipment needed to produce a product.
2. Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
3. Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.
4. Demonstrate laboratory safety rules and procedures.
5. Demonstrate good housekeeping at work station within total laboratory.
6. Identify color-coding safety standards.
7. Explain fire prevention and safety precautions and practices for extinguishing fires.
8. Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

08.02 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--

The student will be able to:

1. Perform roles in a student personnel system or in the Technology Student Association (TSA).
2. Participate as a member of a team.
3. Teach others new skills.
4. Identify skills needed to serve clients/customers.
5. Demonstrate leadership skills.
6. Describe strategies necessary for negotiating agreements.
7. Demonstrate the application of skills necessary to work with people of diverse backgrounds.
8. Form an understanding and appreciation for work after listening to or observing technology workers.
9. Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
10. Form an understanding and appreciation for the roles and work of co-workers.

08.03 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND UTILIZATION-

The student will be able to:

1. Define terms related to computers.
2. Identify and describe methods of information acquisition and evaluation.
3. Discuss advantages and disadvantages in the application of technologies.
4. Produce a plan to organize and maintain information relevant to emerging technologies.
5. Comprehend and communicate information relevant to emerging technologies.
6. Demonstrate the use of computers to process information.

08.04 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--

The student will be able to:

1. Use the features of books and reference materials, such as table of contents, preface, introduction, titles and subtitles, index, glossary, appendix, and bibliography.
2. Read and follow complex written directions.
3. Find, understand, and apply information from a variety of sources (books, manuals, newspapers, periodicals, directories, reference works, computer printouts, and other printed matter or electronic sources such as video display terminals).
4. Use and expand general and specialized vocabulary (including abbreviations, acronyms, and concepts) as appropriate to subject areas studied at the grade level.
5. Write Standard English sentences with correct:
 - sentence structure;
 - verb forms;
 - punctuation, capitalization, possessives, plural forms, and other matters of mechanics;
 - word choice and spelling.
6. Answer and ask questions coherently and concisely, and follow spoken instructions.
7. Identify and comprehend the main and subordinate ideas in lectures and discussions, ask questions to clarify information heard, and report accurately what others have said.
8. Perform with accuracy the computations of addition, subtraction, multiplication, and division using natural numbers, fractions, decimals, and integers.
9. Make and use measurements in both traditional and metric units.
10. Formulate and solve problems in mathematical terms, selecting appropriate approaches and tools (mental computation, trial and error, paper-and-pencil techniques, calculator, and computer).
11. Solve work-related problems involving the basic arithmetic operations using whole numbers, fractions, decimals, and percents.
12. Describe the role of observation and experimentation in the development of scientific theories.

13. Gather scientific information through skills in laboratory, field, and library work.
14. Draw conclusions or make inferences from data.
15. Apply basic scientific/technical solutions to the appropriate problems.

08.05 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--

The student will be able to:

1. Describe and explain steps in the design/problem-solving process.
2. Propose solutions to given problems.
3. Design and implement the optimal solution to a given problem.
4. Document each step of the design/problem-solving process.
5. Demonstrate "Brainstorming" as a process to solve problems.
6. Define "critical thinking" and its value in the problem-solving process.

08.06 EXPRESS AN UNDERSTANDING OF TECHNOLOGICAL SYSTEMS AND THEIR COMPLEX INTERRELATIONSHIPS--

The student will be able to:

1. Demonstrate a knowledge of how social, organizational, and technological systems work.
2. Explore methods used to monitor and correct performance of technological systems.
3. Design and implement an optimal solution to a given problem.
4. Outline major historical technological developments or events.
5. Identify recent advances in technology.
6. Explain problem-solving roles of technology.
7. Forecast a technological development or event.
8. Define technology.

08.07 DEMONSTRATE THE ABILITY TO PROPERLY IDENTIFY, ORGANIZE, PLAN, AND ALLOCATE RESOURCES--

The student will be able to:

1. Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
2. Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
3. Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
4. Display a knowledge of the efficient use of human resources.

08.08 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER CHOICE--

The student will be able to:

1. Describe individual strengths and weaknesses.
2. Discuss individual interests related to a career.
3. Identify careers within specific areas of technology.
4. Explore careers within specific areas of interest.
5. Make a tentative occupational choice based on the information learned and interest developed in this course.
6. Review tentative occupational choices based on the information learned and interest developed in this course.

08.09 DEMONSTRATE EMPLOYABILITY SKILLS AND HABITS--

The student will be able to:

1. Identify employment opportunities.
2. Apply employment seeking skills.
3. Interpret employment capabilities.
4. Demonstrate appropriate work behavior.
5. Maintain safe and healthy environment.
6. Maintain businesslike image.
7. Maintain working relationships with others.
8. Communicate on the job.
9. Adapt to change.
10. Demonstrate a knowledge of manufacturing.
11. Perform mathematical calculations.
12. Compile a portfolio.

08.10 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--

The student will be able to:

1. Define entrepreneurship.
2. Describe the importance of entrepreneurship to the American economy.
3. List the advantages and disadvantages of business ownership.
4. Identify the risks involved in ownership of a business.
5. Identify the necessary personal characteristics of a successful entrepreneur.
6. Identify the business skills needed to operate a small business efficiently and effectively.

08.11 APPLY ADVANCED TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTION TECHNOLOGY--

The student will be able to:

1. Apply advanced technical knowledge and skills about student performance standards.
2. Apply advanced technical knowledge and skills in the construction of a structure.

08.12 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT SELECTING AND PREPARING A CONSTRUCTION SITE--

The student will be able to:

1. Explain the steps and processes for identifying, negotiating, selecting, and acquiring sites for construction.
2. Explain and perform the elementary technical skills for surveying or mapping a construction site.
3. Describe the tools, equipment, and technical skills required for excavating a construction site.
4. Explain the load bearing importance of the earth and the reason for soils testing at a construction site.

08.13 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT DESIGNING AND ENGINEERING CONSTRUCTED WORKS--

The student will be able to:

1. Read and interpret architectural drawings, blueprints, symbols, and construction plans.
2. Describe building codes, permits, and inspection requirements.
3. Sketch or draw a plan for a construction project.

08.14 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONTRACTING, ESTIMATING, BIDDING, AND SCHEDULING--

The student will be able to:

1. Estimate construction costs using various methods including a computer.
2. Read and prepare bid invitations for contractors to build a construction project.
3. Establish criteria for awarding a construction contract.
4. Describe the content of a construction contract and performance bond.

08.15 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTING SUBSTRUCTURES--

The student will be able to:

1. Describe the types, parts, and purposes of foundations.
2. Describe the tools, materials, and processes for setting foundations.
3. Mix, place, and finish concrete for a floor, wall, or footing.
4. Perform the masonry technical skills of laying brick or block.

08.16 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTING SUPERSTRUCTURES--

The student will be able to:

1. Describe mass, solid wall, frame, and air-supported superstructures.
2. Describe the materials used in the construction of superstructures.
3. Use technical carpentry skills, tools, and materials in constructing a wood frame superstructure.
4. Use technical construction skills in building a steel or concrete frame superstructure.
5. Describe factory manufacturing of superstructures and modules.

08.17 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INSTALLING UTILITIES--

The student will be able to:

1. Describe public utility systems for supplying water, electricity, natural gas, and sewerage.
2. Describe the functions and operation of heating, cooling, and ventilating systems.
3. Demonstrate a technical knowledge of plumbing and electrical systems in homes or buildings including home automation and security controls.

4. Use the technical tools and skills to install plumbing and electrical systems utilities.
5. Diagnose and troubleshoot problems with utility systems.

08.18 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ENCLOSING SUPERSTRUCTURES--

The student will be able to:

1. Describe the different types of materials and methods for constructing interior and exterior walls.
2. Describe the different types of materials and methods for laying floors and for building roofs.
3. Describe the different types of methods for constructing or installing windows and doors.
4. Describe the purposes, materials, and methods for insulating enclosed superstructures.
5. Perform the technical skills of enclosing a superstructure.

08.19 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INTERIOR AND EXTERIOR FINISHING OF A CONSTRUCTED STRUCTURE--

The student will be able to:

1. Describe the different types of materials and methods for trimming, painting, and decorating a constructed structure.
2. Describe the types of accessories and fixtures that are installed to finish completed construction.
3. Explain the materials and methods used for the finishing processes of paving and landscaping.
4. Participate in processes of finishing a construction project and site.

08.20 PERFORM ADVANCED STUDY AND TECHNICAL SKILLS RELATED TO CONSTRUCTION TECHNOLOGY--

The student will be able to:

1. Select an individual or group project in cooperation with the teacher.
2. Develop a written plan of work to carry out the project.
3. Show evidence of technical study in support of the project.
4. Perform skills related to the project.
5. Complete the project as planned.

08.21 OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO CONSTRUCTION TECHNOLOGY--

The student will be able to:

1. Collect or produce data on construction technology through the operation of a computer.
2. Estimate construction costs using computer software.
3. Design a structure plan using CAD software.

08.22 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT REGIONAL PLANNING AND THE CONSTRUCTION OF CIVIL OR COMMUNITY STRUCTURES--

The student will be able to:

1. Discuss community and regional planning needs and processes for the construction of roads, parks, dams, airports, seaports, warehouses, shopping centers, factories, and skyscrapers.
2. Develop a scale model of one of the above structures and give a report on the need.

08.23 CONDUCT STRUCTURAL TESTS ON CONSTRUCTED STRUCTURES AND CONSTRUCTION MATERIALS--

The student will be able to:

1. Perform scientific and technical tests on the strength, life, and uses of structures.
2. Perform scientific and technical tests on a variety of construction materials.

08.24 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON A CONSTRUCTION TECHNOLOGY MATERIAL OR PROCESS--

The student will be able to:

1. Identify a problem.
2. State a need to research the problem.
3. Form a hypothesis about the problem.
4. Plan the procedures for researching the problem.
5. Conduct the research following the planned procedures.
6. Present the research findings in a seminar.
7. State conclusions based on the research findings.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Power/Energy and Transportation Systems I

IDAHO CODE NUMBER: TE 1940

- 09.01 Demonstrate the ability to work safely with a variety of technologies.
- 09.02 Demonstrate interpersonal skills as they relate to the workplace.
- 09.03 Identify and apply methods of information acquisition and utilization.
- 09.04 Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.
- 09.05 Demonstrate and apply design/problem-solving processes.
- 09.06 Discuss individual interests and aptitudes as they relate to a career.
- 09.07 Make an informed and meaningful career choice.
- 09.08 Demonstrate technical knowledge and skills about energy technology.
- 09.09 Demonstrate technical knowledge and skills about power technology.
- 09.10 Demonstrate technical knowledge and skills about transportation technology.
- 09.11 Perform independent-study and technical skills related to energy, power, or transportation technology.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Power/Energy and Transportation Systems I

IDAHO CODE NUMBER: TE 1940

09.01 DEMONSTRATE THE ABILITY TO WORK SAFELY WITH A VARIETY OF TECHNOLOGIES--

The student will be able to:

1. Select appropriate tools, procedures, and/or equipment needed to produce a product.
2. Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
3. Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.
4. Follow laboratory safety rules and procedures.
5. Demonstrate good housekeeping at work station within total laboratory.
6. Identify color-coding safety standards.
7. Explain fire prevention and safety precautions and practices for extinguishing fires.
8. Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

09.02 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--

The student will be able to:

1. Perform roles in a student personnel system or in the Idaho Technology Student Association (ID-TSA).
2. Participate as a member of a team.
3. Teach others new skills.
4. Identify skills needed to serve clients/customers.
5. Demonstrate leadership skills.
6. Describe strategies necessary for negotiating agreements.
7. Demonstrate the application of skills necessary to work with people of diverse backgrounds.
8. Form an understanding and appreciation for work after listening to or observing technology workers.
9. Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
10. Form an understanding and appreciation for the roles and work of co-workers.

09.03 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND UTILIZATION-

The student will be able to:

1. Define terms related to computers.
2. Identify and describe methods of information acquisition and evaluation.
3. Discuss advantages and disadvantages in the application of technologies.
4. Produce a plan to organize and maintain information relevant to emerging technologies.
5. Comprehend and communicate information relevant to emerging technologies.
6. Demonstrate the use of computers to process information.
7. Demonstrate the ability to gather information using media centers, electronic communications (i.e. computer networking) and emerging media (CD-ROM, laser disk, etc.)

09.04 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--

The student will be able to:

1. Identify and explain the main and subordinate ideas in a written work.
2. Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.
3. Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.
4. Distinguish fact from opinion.
5. Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.
6. Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.
7. Improve one's own writing by restructuring, correcting errors, and rewriting.
8. Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.
9. Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.
10. Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.
11. Compose unified and coherent correspondence, directions, descriptions, explanations and reports.
12. Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.
13. Conceive and develop ideas about a topic for the purpose of speaking to a group; choose and organize related ideas; present them clearly in Standard English; and evaluate similar presentations by others.
14. Use the mathematics of:
 - integers, fractions, and decimals;
 - ratios, proportions, and percentages;
 - roots and powers;
 - algebra;

-geometry.

15. Make estimates and approximations, and judge the reasonableness of a result.
16. Use elementary concepts of probability and statistics.
17. Draw, read, and analyze graphs, charts, and tables.
18. Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and field work.
19. Organize and communicate the results obtained by observation and experimentation.
20. Apply the basic principles of biology, physics, and chemistry. (Properties of matter; structure of compounds; concepts of motion; temperature, pressure and volume; work, power, force and energy; machines; human cell structure).
21. Identify problems rooted in basic biology, physics, or chemistry (effects of hazardous materials on health and safety, effects of drugs on health, trouble shooting problems on a machine).

09.05 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--

The student will be able to:

1. Describe and explain steps in the design/problem-solving process.
2. Propose solutions to given problems.
3. Design and implement the optimal solution to a given problem.
4. Document each step of the design/problem-solving process.
5. Demonstrate "Brainstorming" as a process to solve problems.
6. Define "critical thinking" and its value in the problem-solving process.

09.06 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--

The student will be able to:

1. Describe individual strengths and weaknesses.
2. Discuss individual interests related to a career.
3. Identify careers within specific areas of technology.
4. Explore careers within specific areas of interest.

09.07 MAKE AN INFORMED AND MEANINGFUL CAREER CHOICE--

The student will be able to:

1. Make a tentative occupational choice based on the information learned and interest developed in this course.
2. Review tentative occupational choices based on the information learned and interest developed in this course.

09.08 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ENERGY TECHNOLOGY--

The student will be able to:

1. Demonstrate knowledge and understanding of sources of thermal energy.
2. Demonstrate knowledge and understanding of sources of radiant energy.
3. Demonstrate knowledge and understanding of sources of nuclear energy.
4. Demonstrate knowledge and understanding of sources of chemical energy.
5. Demonstrate knowledge and understanding of sources of electrical energy.
6. Demonstrate knowledge and understanding of sources of mechanical energy.
7. Demonstrate knowledge and understanding of sources of fluid energy.
8. Define Energy
9. Be able to use units of energy measurement to calculate input and output.
10. Be able to apply knowledge of energy technology in making a working system.

09.09 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT POWER TECHNOLOGY--

The student will be able to:

1. Define Power
2. Demonstrate method of measuring power
3. Demonstrate knowledge, understanding and application of simple machines.
4. Calculate problems using power ratio.
5. Demonstrate an understanding of hydraulic/pneumatic power control
6. Set up and Calculate power problems.
7. Demonstrate knowledge and applications in controlling power.
Electricity/Electronics - AC/DC, Components, Digital electronics/logic circuits, Hydraulic/pneumatic, Mechanical
8. Identify methods of power transmission.
9. Demonstrate knowledge and understand of heat engines, their parts and operation
10. Students will be able to solve problems using more than one method of power control.

09.10 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT TRANSPORTATION TECHNOLOGY--

The student will be able to:

1. Understand historical development of each transportation system.
2. Understand and apply the theories of each transportation system in developing efficient working models.
3. Design and construct vehicles in each transportation system.
4. Demonstrate knowledge of land transportation.
5. Demonstrate knowledge of ground effect transportation.
6. Demonstrate knowledge of air transportation.
7. Demonstrate knowledge of space transportation.
8. Demonstrate knowledge of marine transportation.
9. Illustrate or design an intermodal transportation system.

09.11 PERFORM INDEPENDENT-STUDY AND TECHNICAL SKILLS RELATED TO ENERGY, POWER, OR TRANSPORTATION TECHNOLOGY--

The student will be able to:

1. Select an individual or group project in cooperation with the teacher.
2. Work with a mentor from the school or community to help complete the project.
3. Develop a written plan of work to carry out the project.
4. Show evidence of technical study in support of the project.
5. Perform skills related to the project.
6. Complete the project as planned.
7. Collect or produce data on energy and power through the operation of computer.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Power/Energy and Transportation Systems II

IDAHO CODE NUMBER: TE 1941

- 10.01 Express an understanding of technological systems and their complex interrelationships.
- 10.02 Measure and report the power and efficiency of power producing systems.
- 10.03 Demonstrate the ability to properly identify, organize, plan, and allocate resources.
- 10.04 Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.
- 10.05 Demonstrate an understanding of entrepreneurship.
- 10.06 Demonstrate technical knowledge and skills about steam power technology.
- 10.07 Demonstrate technical knowledge and skills about diesel engine power technology.
- 10.08 Demonstrate technical knowledge and skills about internal combustion power technology.
- 10.09 Demonstrate technical knowledge and skills about hydraulic and pneumatic power technology.
- 10.10 Demonstrate technical knowledge and skills about electric power technology.
- 10.11 Demonstrate technical knowledge and skills about jet engine power technology.
- 10.12 Demonstrate technical knowledge and skills about rocket engine technology.
- 10.13 Demonstrate technical knowledge and skills about solar cells and fuel cells.
- 10.14 Demonstrate technical knowledge and skills about nuclear power technology.
- 10.15 Perform independent advanced-study and technical skills related to energy, power, or transportation technology.
- 10.16 Demonstrate technical knowledge and skills about powered transportation systems.
- 10.17 Conduct a research and experimentation project on an energy and power system.

- 10.18 Demonstrate knowledge of history of flight.
- 10.19 Demonstrate knowledge of principles of flight.
- 10.20 Demonstrate knowledge of aerospace vehicles, difference of aircraft and vehicles.
- 10.21 Demonstrate knowledge of aerospace environments.
- 10.22 Demonstrate knowledge of aerospace and international issues.
- 10.23 Demonstrate knowledge of the future of aerospace.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Power/Energy and Transportation Systems II

IDAHO CODE NUMBER: TE 1941

10.01 EXPRESS AN UNDERSTANDING OF TECHNOLOGICAL SYSTEMS AND THEIR
COMPLEX INTERRELATIONSHIPS--

The student will be able to:

1. Demonstrate a knowledge of how social, organizational, and technological systems work.
2. Explore methods used to monitor and correct performance of technological systems.
3. Design and implement an optimal solution to a given problem.
4. Outline major historical technological developments or events.
5. Identify recent advances in technology.
6. Explain problem-solving roles of technology.
7. Forecast a technological development or event.
8. Define technology.

10.02 MEASURE AND REPORT THE POWER AND EFFICIENCY OF POWER PRODUCING
SYSTEMS--

The student will be able to:

1. Measure the power and efficiency of a mechanical system.
2. Measure the power and efficiency of a fluid system.
3. Measure the power and efficiency of an electrical system.
4. Measure the power and efficiency of a thermal system.

10.03 DEMONSTRATE THE ABILITY TO PROPERLY IDENTIFY, ORGANIZE, PLAN, AND
ALLOCATE RESOURCES--

The student will be able to:

1. Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
2. Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
3. Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
4. Display a knowledge of the efficient use of human resources.

10.04 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--

The student will be able to:

1. Use the features of books and reference materials, such as table of contents, preface, introduction, titles and subtitles, index, glossary, appendix, and bibliography.
2. Read and follow complex written directions.
3. Find, understand, and apply information from a variety of sources (books, manuals, newspapers, periodicals, directories, reference works, computer printouts, and other printed matter or electronic sources such as video display terminals).
4. Use and expand general and specialized vocabulary (including abbreviations, acronyms, and concepts) as appropriate to subject areas studied at the grade level.
5. Write Standard English sentences with correct:
 - sentence structure;
 - verb forms;
 - punctuation, capitalization, possessives, plural forms, and other matters of mechanics;
 - word choice and spelling.
6. Answer and ask questions coherently and concisely, and follow spoken instructions.
7. Identify and comprehend the main and subordinate ideas in lectures and discussions, ask questions to clarify information heard, and report accurately what others have said.
8. Perform with accuracy the computations of addition, subtraction, multiplication, and division using natural numbers, fractions, decimals, and integers.
9. Make and use measurements in both traditional and metric units.
10. Formulate and solve problems in mathematical terms, selecting appropriate approaches and tools (mental computation, trial and error, paper-and-pencil techniques, calculator, and computer).
11. Solve work-related problems involving the basic arithmetic operations using whole numbers, fractions, decimals, and percents.
12. Describe the role of observation and experimentation in the development of scientific theories.
13. Gather scientific information through skills in laboratory, field, and library work.
14. Draw conclusions or make inferences from data.
15. Apply basic scientific/technical solutions to the appropriate problems.

10.05 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--

The student will be able to:

1. Define entrepreneurship.
2. Describe the importance of entrepreneurship to the American economy.
3. List the advantages and disadvantages of business ownership.
4. Identify the risks involved in ownership of a business.
5. Identify the necessary personal characteristics of a successful entrepreneur.

6. Identify the business skills needed to operate a small business efficiently and effectively.

10.06 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT STEAM POWER TECHNOLOGY--

The student will be able to:

1. Identify and define the key terms, categories, and parts of steam power technology.
2. Describe the operating theory and principles of steam engines and steam turbines.
3. Explain the uses and applications of steam power engines and systems.
4. Identify industries that produce and use steam power systems.
5. Describe energy and fuel sources for steam power operations.
6. Perform technical skills in building, assembling, maintaining, or operating a steam power system.

10.07 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT DIESEL ENGINE POWER TECHNOLOGY--

The student will be able to:

1. Identify and define key terms, categories, and parts of diesel engine power technology.
2. Describe the operating theory and principles of diesel engine power technology.
3. Explain the uses and applications of diesel engines.
4. Identify industries that produce and use diesel engines.
5. Describe energy and fuel sources for diesel engines.
6. Perform technical skills in building, assembling, maintaining, or operating diesel engines.

10.08 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INTERNAL COMBUSTION POWER TECHNOLOGY--

The student will be able to:

1. Identify and define the key terms, categories, and parts of gasoline engine internal combustion technology.
2. Describe the operating theory and principles of internal combustion gasoline engines.
3. Explain the uses and applications of internal combustion gasoline engines.
4. Identify industries that produce and use internal combustion gasoline engines.
5. Describe energy and fuel sources for internal combustion gasoline engines.
6. Perform technical skills in building, assembling, maintaining, or operating internal combustion gasoline engines.

10.09 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT HYDRAULIC AND PNEUMATIC POWER TECHNOLOGY--

The student will be able to:

1. Identify and define key terms, categories, and parts of hydraulic and pneumatic power technology.
2. Describe the operating theory and principles of hydraulic and pneumatic power technology.
3. Explain the uses and applications of hydraulic and pneumatic power systems.
4. Identify industries that produce and use hydraulic and pneumatic power systems.
5. Describe the energy sources for hydraulic and pneumatic power systems.
6. Perform technical skills in building, assembling, maintaining, or operating hydraulic and pneumatic power systems.

10.10 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ELECTRIC POWER TECHNOLOGY--

The student will be able to:

1. Identify and define the key terms, categories, and parts of electric power technology.
2. Describe the operating theory and principles of electric power systems.
3. Explain the uses and applications of electric power systems.
4. Identify industries that produce and use electric power systems.
5. Describe energy and fuel sources for electric power systems.
6. Perform technical skills in building, assembling, maintaining, or operating an electric power system.

10.11 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT JET ENGINE POWER TECHNOLOGY--

The student will be able to:

1. Identify and define key terms, categories, and parts of jet engine power technology.
2. Describe the operating theory and principles of jet engine power technology.
3. Explain the uses and applications of jet engines.
4. Identify industries that produce and use jet engines.
5. Describe energy and fuel sources for jet engines.
6. Perform technical skills in building, assembling, maintaining, or operating jet engines.

10.12 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ROCKET ENGINE POWER TECHNOLOGY--

The student will be able to:

1. Identify and define key terms, categories, and parts of rocket engine power technology.
2. Describe the operating theory and principles of rocket engine power technology.
3. Explain the uses and applications of rocket engines.
4. Identify industries that produce and use rocket engines.
5. Describe energy and fuel sources for rocket engines.
6. Perform technical skills in building, assembling, maintaining, or operating rocket engines.

10.13 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT SOLAR CELLS AND FUEL CELLS--

The student will be able to:

1. Identify and define key terms, categories, and parts of solar cell and fuel cell power technology.
2. Describe the operating theory and principles of solar cell and fuel cell power technology.
3. Explain the uses and applications of solar cell and fuel cell power technology.
4. Identify the industries that produce and use solar cell and fuel cell power systems.
5. Describe the energy and fuel sources for solar cell and fuel cell power systems.
6. Perform technical skills in building, assembling, maintaining, or operating solar cell or fuel cell systems.

10.14 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT NUCLEAR POWER TECHNOLOGY--

The student will be able to:

1. Identify and define the key terms, categories, and parts of nuclear power technology.
2. Describe the operating theory and principles of nuclear power systems.
3. Explain the uses and applications of nuclear power systems.
4. Identify industries that produce and use nuclear power systems.
5. Describe energy and fuel sources for nuclear power systems.
6. Perform technical skills in building, assembling, maintaining, or operating a simulated or real nuclear power system.

10.15 PERFORM INDEPENDENT ADVANCED-STUDY AND TECHNICAL SKILLS RELATED TO ENERGY, POWER, OR TRANSPORTATION TECHNOLOGY--

The student will be able to:

1. Select an individual or group project in cooperation with the teacher.
2. Work with a mentor from the school or community to help complete the project.
3. Develop a written plan of work to carry out the project.
4. Show evidence of technical study in support of the project.
5. Perform skills related to the project.
6. Complete the project as planned.
7. Collect or produce data on energy and power through the operation of a computer.

10.16 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT POWERED TRANSPORTATION SYSTEMS--

The student will be able to:

1. Identify and define key terms, categories, and parts of land, water, air, and space transportation systems.
2. Describe the theories and operating principles of land, water, air, and space transportation.

3. Explain the uses and applications of land, water, air and space transportation vehicles.
4. Identify industries that produce and use land, water, air, and space transportation vehicles.
5. Describe the energy and power systems used in land, water, air, and space vehicles.
6. Perform technical skills in building, assembling, servicing, or operating a complete transportation vehicle.
7. Demonstrate knowledge of the future of land, ground effect, air, water, and space modes of transportation.

10.17 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON AN ENERGY AND POWER SYSTEM--

The student will be able to:

1. Identify a problem.
2. State a need to research the problem.
3. Form a hypothesis about the problem.
4. Plan the procedures for researching the problem.
5. Conduct the research following the planned procedures.
6. Present the research findings in a seminar.
7. State conclusions based on the research findings.

10.18 DEMONSTRATE KNOWLEDGE OF HISTORY OF FLIGHT--

The student will be able to:

1. Investigate the evolution of flight technology.
2. Identify early flight attempts.
3. Study the effects of world issues on the development of flight.

10.19 DEMONSTRATE KNOWLEDGE OF PRINCIPLES OF FLIGHT--

The student will be able to:

1. Gain an understanding of basic aerodynamic principles.
2. Apply an understanding of aircraft motion and control.
3. Demonstrate the operations of Aircraft propulsion.
4. Demonstrate the principles of navigation in flight.

10.20 DEMONSTRATE KNOWLEDGE OF AEROSPACE VEHICLES, DIFFERENCE OF AIRCRAFT AND VEHICLES--

The student will be able to:

1. Identify each aerospace vehicle type and explain the properties of flight associated with each type.
2. Apply the principles of flight to each type of aerospace vehicle.

10.21 DEMONSTRATE KNOWLEDGE OF AEROSPACE ENVIRONMENTS--

The student will be able to:

1. Survey the Galactic Community.
2. Survey the Solar System.
3. Survey the Earth's atmosphere.
4. Analyze the effects space flight has on the human body.
5. Study the effects that Humans have on Space.

10.22 DEMONSTRATE KNOWLEDGE OF AEROSPACE AND INTERNATIONAL ISSUES--

The student will be able to:

1. Identify the effects of international issues on aerospace.
2. Evaluate the effects that aerospace has had on international issues; environment, world trade, government policies, etc.

10.23 DEMONSTRATE KNOWLEDGE OF THE FUTURE OF AEROSPACE--

The student will be able to:

1. Forecast possible advancements in prolonged space travel.
2. Forecast possible advancements in artificial environments.
3. Forecast possible advancements in space-related production technology.
4. Forecast possible advancements in biotechnology.
5. Forecast possible advancements in clothing.
6. Forecast possible advancements in entertainment and recreation.
7. Forecast possible advancements in transportation technology.
8. Describe present and future aerospace careers.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Emerging Technology Studies

IDAHO CODE NUMBER: TE 1926

- 11.01 Demonstrate the ability to work safely with a variety of technologies.
- 11.02 Demonstrate interpersonal skills as they relate to the workplace.
- 11.03 Identify and apply methods of information acquisition and utilization.
- 11.04 Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.
- 11.05 Demonstrate and apply design/problem-solving processes.
- 11.06 Express an understanding of technological systems and their complex interrelationships.
- 11.07 Demonstrate the ability to properly identify, organize, plan, and allocate resources.
- 11.08 Discuss individual interests and aptitudes as they relate to a career.
- 11.09 Demonstrate employability skills and habits.
- 11.10 Demonstrate an understanding of entrepreneurship.
- 11.11 Make an informed and meaningful career choice.
- 11.12 Demonstrate and apply principles related to the following energy systems: fluid, thermal, electrical, and mechanical.
- 11.13 Communicate the results of experiments or research through oral, written or multimedia presentations.
- 11.14 Demonstrate graphical literacy and the use of graphical representations in analysis and design.
- 11.15 Describe the legal, social, ethical, and economic factors that influence a technology related topic or engineering design..
- 11.16 Discuss careers and practices related to emerging/engineering technology topics.

- 11.17 Demonstrate research techniques and engineering analysis/design methods.
- 11.18 Demonstrate the engineering design reporting process as a team effort.
- 11.19 Demonstrate and apply mechanical, fluid, electrical and thermal system principles.
- 11.20 Demonstrate a knowledge of materials and processes.
- 11.21 Use tools, machines, calculators, and computers necessary for obtaining solutions to design problems.
- 11.22 Describe the functional characteristics of the engineering design team.
- 11.23 Conduct a research, experimentation or design project related to engineering technology.
- 11.24 Contact and interview an expert in the field related to the chosen technology topic.
- 11.25 Utilize current technology to access information related to the chosen technology topic.
- 11.26 Model an idea using appropriate computer simulation software or scale modeling techniques.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Emerging Technology Studies

IDAHO CODE NUMBER: TE 1926

11.01 DEMONSTRATE THE ABILITY TO WORK SAFELY WITH A VARIETY OF TECHNOLOGIES--

The student will be able to:

1. Select appropriate tools, procedures, and/or equipment needed to produce a product.
2. Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
3. Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.
4. Follow laboratory safety rules and procedures.
5. Demonstrate good housekeeping at work station within total laboratory.
6. Identify color-coding safety standards.
7. Explain fire prevention and safety precautions and practices for extinguishing fires.
8. Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

11.02 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--

The student will be able to:

1. Perform roles in a student personnel system or in the Idaho Technology Student Association (ID-TSA).
2. Participate as a member of a team.
3. Teach others new skills.
4. Identify skills needed to serve clients/customers.
5. Demonstrate leadership skills.
6. Describe strategies necessary for negotiating agreements.
7. Demonstrate the application of skills necessary to work with people of diverse backgrounds.
8. Form an understanding and appreciation for work after listening to or observing technology workers.
9. Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
10. Form an understanding and appreciation for the roles and work of co-workers.

11.03 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND UTILIZATION-

The student will be able to:

1. Define terms related to computers.
2. Identify and describe methods of information acquisition and evaluation.
3. Discuss advantages and disadvantages in the application of technologies.
4. Produce a plan to organize and maintain information relevant to emerging technologies.
5. Comprehend and communicate information relevant to emerging technologies.
6. Demonstrate the use of computers to process information.

11.04 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--

The student will be able to:

1. Identify and explain the main and subordinate ideas in a written work.
2. Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.
3. Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.
4. Distinguish fact from opinion.
5. Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.
6. Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.
7. Improve one's own writing by restructuring, correcting errors, and rewriting.
8. Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.
9. Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.
10. Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.
11. Compose unified and coherent correspondence, directions, descriptions, explanations and reports.
12. Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.
13. Conceive and develop ideas about a topic for the purpose of speaking to a group; choose and organize related ideas; present them clearly in Standard English; and evaluate similar presentations by others.
14. Use the mathematics of:
 - integers, fractions, and decimals;
 - ratios, proportions, and percentages;
 - roots and powers;
 - algebra;
 - geometry.
15. Make estimates and approximations, and judge the reasonableness of a result.
16. Use elementary concepts of probability and statistics.

17. Draw, read, and analyze graphs, charts, and tables.

18. Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and field work.
19. Organize and communicate the results obtained by observation and experimentation.
20. Apply the basic principles of biology, physics, and chemistry. (properties of matter; structure of compounds; concepts of motion; temperature, pressure and volume; work, power, force and energy; machines; human cell structure).
21. Identify problems rooted in basic biology, physics, or chemistry (effects of hazardous materials on health and safety, effects of drugs on health, trouble shooting problems on a machine).

11.05 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--

The student will be able to:

1. Describe and explain steps in the design/problem-solving process.
2. Propose solutions to given problems.
3. Design and implement the optimal solution to a given problem.
4. Document each step of the design/problem-solving process.
5. Demonstrate "Brainstorming" as a process to solve problems.
6. Define "critical thinking" and its value in the problem-solving process.

11.06 EXPRESS AN UNDERSTANDING OF TECHNOLOGICAL SYSTEMS AND THEIR COMPLEX INTERRELATIONSHIPS--

The student will be able to:

1. Demonstrate a knowledge of how social, organizational, and technological systems work.
2. Explore methods used to monitor and correct performance of technological systems.
3. Design and implement an optimal solution to a given problem.
4. Outline major historical technological developments or events.
5. Identify recent advances in technology.
6. Explain problem-solving roles of technology.
7. Forecast a technological development or event.
8. Define technology.

11.07 DEMONSTRATE THE ABILITY TO PROPERLY IDENTIFY, ORGANIZE, PLAN, AND ALLOCATE RESOURCES--

The student will be able to:

1. Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
2. Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
3. Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
4. Display a knowledge of the efficient use of human resources.

11.08 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--

The student will be able to:

1. Describe individual strengths and weaknesses.
2. Discuss individual interests related to a career.
3. Identify careers within specific areas of technology.
4. Explore careers within specific areas of interest.

11.09 DEMONSTRATE EMPLOYABILITY SKILLS AND HABITS--

The student will be able to:

1. Identify employment opportunities.
2. Apply employment seeking skills.
3. Interpret employment capabilities.
4. Demonstrate appropriate work behavior.
5. Maintain safe and healthy environment.
6. Maintain businesslike image.
7. Maintain working relationships with others.
8. Communicate on the job.
9. Adapt to change.
10. Demonstrate a knowledge of manufacturing.
11. Perform mathematical calculations.
12. Compile a portfolio.

11.10 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--

The student will be able to:

1. Define entrepreneurship.
2. Describe the importance of entrepreneurship to the American economy.
3. List the advantages and disadvantages of business ownership.
4. Identify the risks involved in ownership of a business.
5. Identify the necessary personal characteristics of a successful entrepreneur.
6. Identify the business skills needed to operate a small business efficiently and effectively.

11.11 MAKE AN INFORMED AND MEANINGFUL CAREER CHOICE--

The student will be able to:

1. Make a tentative occupational choice based on the information learned and interest developed in this course.
2. Review tentative occupational choices based on the information learned and interest developed in this course.

11.12 DEMONSTRATE AND APPLY PRINCIPLES RELATED TO THE FOLLOWING ENERGY SYSTEMS: FLUID, THERMAL, ELECTRICAL, AND MECHANICAL--

The student will be able to:

1. Assemble, operate, and identify the parts of a system which demonstrates fluid system principles.
2. Demonstrate and apply principles of force, work, rate, resistance, energy, power, and force transformers relating to fluid systems.
3. Assemble, operate, and identify the parts of a system which demonstrates thermal system principles.
4. Demonstrate and apply principles of force, work, rate, resistance, energy, power, and force transformers relating to thermal systems.
5. Assemble, operate, and identify the parts of a system which demonstrates electrical system principles.
6. Demonstrate and apply principles of force, work, rate, resistance, energy, power, and force transformers relating to electrical systems.
7. Assemble, operate, and identify the parts of a system which demonstrates mechanical systems principles.
8. Demonstrate and apply principles of force, work, rate, resistance, energy, power, and force transformers relating to mechanical systems.

11.13 COMMUNICATE THE RESULTS OF EXPERIMENTS THROUGH RESEARCH, WRITTEN OR MULTIMEDIA PRESENTATIONS--

The student will be able to:

1. Understand and interpret basic engineering drawings.
2. Measure quantities and conduct basic tests according to published procedures.
3. Use precision measuring tools and instruments to layout, measure and inspect parts or articles.
4. Sketch objects using multi-view and pictorial principles.
5. Prepare drawings using basic technical drawing instruments for orthographic and isometric projections.
6. Use engineering design graphics and descriptive geometry in the solution of design problems.
7. Describe graphic communications principles.
8. Use current multimedia authoring software and hardware to produce a multimedia presentation of the project.

11.14 DEMONSTRATE GRAPHICAL LITERACY AND THE USE OF GRAPHICAL REPRESENTATIONS IN ANALYSIS AND DESIGN--

The student will be able to:

1. Identify the basic tools and instruments for engineering design graphics.
2. Express knowledge and basic theory in engineering design graphics.
3. Make a technological decision related to engineering design graphics.
4. Interpret engineering design graphics, using various systems of measurement.
5. Define and outline steps in the engineering design graphics process.

6. Describe the use of sketches and assembly drawings in the engineering design process.
7. Use engineering design graphics to describe the solution of an engineering problem.

11.15 DESCRIBE THE LEGAL, SOCIAL, ETHICAL, AND ECONOMIC FACTORS THAT INFLUENCE A TECHNOLOGY RELATED TOPIC OR ENGINEERING DESIGN--

The student will be able to:

1. Discuss the legal constraints placed on the practice of engineering.
2. Discuss the underlying principles of professional ethics.
3. Discuss the underlying principles of business (i.e., industrial) ethics.
4. Describe how economics and resource availability can influence design.
5. Explain the need and use of design standards.
6. Describe the legal protection afforded an inventor or designer.

11.16 DISCUSS CAREERS AND PRACTICES RELATED TO EMERGING/ENGINEERING TECHNOLOGY TOPICS--

The student will be able to:

1. Summarize the professional characteristics of engineers.
2. List the principal fields for specialization in engineering.
3. Describe the procedures for becoming a registered engineer in Idaho.
4. Describe the procedures for becoming a certified engineering technician.
5. Outline the typical steps to follow to prepare for a course of study leading to an engineering career.

11.17 DEMONSTRATE RESEARCH TECHNIQUES AND ENGINEERING ANALYSIS/DESIGN METHODS--

The student will be able to:

1. Define the terms: analysis, design, and application.
2. Define the experimental method as it is applied to design.
3. Describe methodology.
4. Describe simulation.
5. Prepare a model of a design solution to an engineering problem.
6. Prepare a graphical solution to an engineering problem.
7. Prepare a mathematical solution to an engineering problem (using either a calculator or computer).

11.18 DEMONSTRATE THE ENGINEERING DESIGN REPORTING PROCESS AS A TEAM EFFORT--

The student will be able to:

1. Research an engineering achievement and prepare a model, or display.
2. Deliver a short oral briefing which explains a technical device, process or achievement.
3. As a team, present a technical report on an engineering design problem, concept or issue.

11.19 DEMONSTRATE AND APPLY MECHANICAL, FLUID, ELECTRICAL AND THERMAL SYSTEM PRINCIPLES--

The student will be able to:

1. Demonstrate the design solution to a mechanical system problem.
2. Demonstrate the design solution to a fluid system problem.
3. Demonstrate the design solution to an electrical system problem.
4. Demonstrate the design solution to a thermal system problem.
5. Select materials and processes to satisfy specific design criteria.
6. Select a problem or product for improvement using the design methodology.

11.20 DEMONSTRATE A KNOWLEDGE OF MATERIALS AND PROCESSES--

The student will be able to:

1. Describe the physical and chemical properties of engineering materials in terms of their structure.
2. List the causes of failure in materials and give procedures to prevent such failure.
3. Experiment with processes used with metal, woods, polymers, composite materials and adhesives.

11.21 USE TOOLS, MACHINES, CALCULATORS, AND COMPUTERS NECESSARY FOR OBTAINING SOLUTIONS TO DESIGN PROBLEMS--

The student will be able to:

1. Demonstrate the use of various graphs to categorize and display data.
2. Make decisions using graphical data presentations.
3. Demonstrate the use of a nomograph in solving equations.
4. Use a numerical calculator to solve complex equations either by direct solution or iteration (trial and error).
5. Use a computer and applications software to solve a design problem by simulation.
6. Demonstrate graphical vector analysis.

11.22 DESCRIBE THE FUNCTIONAL CHARACTERISTICS OF THE ENGINEERING DESIGN TEAM--

The student will be able to:

1. Describe work breakdown organization.
2. Describe work group organization schemes including functional and hierarchical schemes.
3. Describe the function of management in general and project management in particular.
4. Describe a typical design project team structure.
5. Outline a research methodology.
6. Describe brain-storming.

11.23 CONDUCT A RESEARCH, EXPERIMENTATION OR DESIGN PROJECT RELATED TO ENGINEERING TECHNOLOGY--

The student will be able to:

1. Choose appropriate research materials such as professional journals, magazines, reference books, CD-ROM, or Internet databases to determine a unique research topic.
2. Gather and evaluate research data with regard to the design of a technology-related project.
3. Synthesize research data into an experiment plan.
4. Conduct an experiment related to the technology topic.

11.24 CONTACT AND INTERVIEW AN EXPERT IN THE FIELD RELATED TO THE CHOSEN TECHNOLOGY TOPIC--

The student will be able to:

1. Locate and interview experts in the field of research using sources such as the Thomas Register, local business and industry, advisory committee members.
2. Conduct an Internet search to find an expert in the field of study.
3. Invite local experts to present to the class

11.25 UTILIZE CURRENT TECHNOLOGY TO ACCESS INFORMATION RELATED TO THE CHOSEN TECHNOLOGY TOPIC--

The student will be able to:

1. Utilize CD-ROM, laser disk, telecommunication, or other sources to research technology-related topics.
2. Contact and interview university-level experts in the field of research.

11.26 MODEL AN IDEA USING APPROPRIATE COMPUTER SIMULATION SOFTWARE OR SCALE MODELING TECHNIQUES--

The student will be able to:

1. Identify a technology-related problem.
2. Research the problem using print and electronic search methods.
3. Analyze and evaluate the research data.
4. Synthesize the research data and apply it to the problem.
5. Design and conduct a test or experiment related to the problem.
6. Evaluate the results of the experiment.
7. Reformulate and re-try the experiment based on evaluation.
8. Produce a multimedia presentation about the technology topic.
9. Use appropriate model making techniques and materials to make a working model of the technology topic.
10. Simulate the research topic using computer animation or simulation software.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Principles of Technology I

IDAHO CODE NUMBER: TE 1971

- 12.01 Demonstrate principles and applications of force in mechanical, fluid, electrical and thermal systems.
- 12.02 Demonstrate solutions to work problems and principles related to mechanical, electrical and fluid devices.
- 12.03 Calculate the work rate of electrical, mechanical and fluid systems.
- 12.04 Demonstrate the positive and negative affects of resistance related to mechanical, thermal, fluid and air systems.
- 12.05 Demonstrate the concept of energy related to mechanical, electrical, fluid, and thermal systems.
- 12.06 Calculate the results of power related to mechanical, thermal, fluid, air and electrical systems.
- 12.07 Demonstrate solutions to the principles of transformers as applied to mechanical, fluid, and electrical systems.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Principles of Technology I

IDAHO CODE NUMBER: TE 1971

12.01 DEMONSTRATE PRINCIPLES AND APPLICATIONS OF FORCE IN MECHANICAL, FLUID, ELECTRICAL AND THERMAL SYSTEMS--

The student will be able to:

1. Apply principles of force in mechanical systems.
2. Demonstrate the principles of pressure in fluid systems.
3. Demonstrate the principle of voltage in electrical systems.
4. Apply temperature principles in thermal systems.

12.02 DEMONSTRATE SOLUTIONS TO WORK PROBLEMS AND PRINCIPLES RELATED TO MECHANICAL, ELECTRICAL AND FLUID DEVICES--

The student will be able to:

1. Solve work problems in mechanical systems.
2. Demonstrate the application of work done by a winch
3. Apply the principles of work done in fluid systems.
4. Apply math skills needed to calculate work done in mechanical fluid systems.
5. Demonstrate through application the work done by a piston.
6. Calculate the work done by a water pump.
7. Solve problems relating to work done in electrical systems.
8. Determine the work done by motors and solenoids.

12.03 CALCULATE THE WORK RATE OF ELECTRICAL, MECHANICAL AND FLUID SYSTEMS--

The student will be able to:

1. Measure rate in mechanical systems.
2. Measure rates on conveyor belts.
3. Measure angular rate with a stroboscope.
4. Demonstrate the applied principles of rate in fluid systems.
5. Measure liquid-flow rate in a channel.
6. Measure gas-flow rates with an orifice.
7. Demonstrate the principle of rate in electrical systems.
8. Demonstrate the principles of rate in thermal systems.
9. Demonstrate proper use of term couple devices in measuring heat-flow rate.

12.04 DEMONSTRATE THE POSITIVE AND NEGATIVE AFFECTS OF RESISTANCE RELATED TO MECHANICAL, THERMAL, FLUID AND AIR SYSTEMS--

The student will be able to:

1. Apply principles of resistance in mechanical systems.
2. Demonstrate the principles of friction.
3. Apply the basic principles of resistance in fluid and air systems.
4. Apply basic electronic principles to solve resistance problems in electrical systems.
5. Apply the principles of resistance in thermal systems.

12.05 DEMONSTRATE THE CONCEPT OF ENERGY RELATED TO MECHANICAL, ELECTRICAL, FLUID, AND THERMAL SYSTEMS--

The student will be able to:

1. Apply energy principles in a mechanical system.
2. Demonstrate the principles of energy in mechanical and fluid systems.
3. Apply energy concepts in basic electrical systems.
4. Demonstrate the principles of energy in thermal systems.

12.06 CALCULATE THE RESULTS OF POWER RELATED TO MECHANICAL, THERMAL, FLUID, AIR AND ELECTRICAL SYSTEMS--

The student will be able to:

1. Apply principles of power in mechanical system.
2. Measure power in linear and rotational mechanical systems.
3. Demonstrate the principles of power in fluid/air systems.
4. Apply the principle of power in electrical systems.
5. Relate power formulas in thermal systems.

12.07 DEMONSTRATE SOLUTIONS TO THE PRINCIPLES OF TRANSFORMERS AS APPLIED TO MECHANICAL, FLUID, AND ELECTRICAL SYSTEMS--

The student will be able to:

1. Solve linear transformer problems in mechanical systems.
2. Demonstrate the principle of transformers in rotational mechanical systems.
3. Apply the principle of transformers in fluid systems.
4. Determine the results of transformers in electrical systems.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Principles of Technology II

IDAHO CODE NUMBER: TE 1972

- 13.01 Demonstrate principles and applications of momentum in mechanical, fluid, electrical and thermal systems.
- 13.02 Demonstrate solutions to waves and vibration problems and principles related to mechanical, electrical and fluid devices.
- 13.03 Demonstrate the use of energy converters related to electrical, mechanical, and fluid power systems.
- 13.04 Demonstrate the use of transducers related to mechanical, thermal, fluid and air systems.
- 13.05 Demonstrate the concept of radiation related to mechanical, thermal, fluid, air and electrical systems.
- 13.06 Demonstrate principles of optical systems related to mechanical, thermal, fluid, air and electrical systems.
- 13.07 Demonstrate solutions to time constants as applied to mechanical, fluid, and electrical systems.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Principles of Technology II

IDAHO CODE NUMBER: TE 1972

13.01 DEMONSTRATE PRINCIPLES AND APPLICATIONS OF MOMENTUM IN MECHANICAL, FLUID, ELECTRICAL AND THERMAL SYSTEMS--

The student will be able to:

1. Demonstrate linear momentum and list its variables.
2. Demonstrate angular momentum and list its variables.
3. Demonstrate impulse and list its variables.
4. State the law of conservation of momentum as it affects linear or angular motion.
5. Apply the relationship of impulse to change in momentum.
6. List examples of how momentum affects mechanical and fluid systems.

13.02 DEMONSTRATE SOLUTIONS TO WAVES AND VIBRATION PROBLEMS AND PRINCIPLES RELATED TO MECHANICAL, ELECTRICAL AND FLUID DEVICES--

The student will be able to:

1. Demonstrate wave motion in general.
2. Demonstrate how waves transmit (move) energy.
3. List the characteristics that are used to describe a wave.
4. Distinguish between longitudinal and transverse waves.
5. Identify workplace applications where waves and vibrations are found.

13.03 DEMONSTRATE THE USE OF ENERGY CONVERTER RELATED TO ELECTRICAL, MECHANICAL, AND FLUID POWER SYSTEMS--

The student will be able to:

1. Demonstrate the purpose of an energy converter.
2. Identify converters that change mechanical energy to fluid or electrical energy.
3. Identify converters that change fluid energy to mechanical or thermal energy.
4. Identify converters that change electrical energy to mechanical or thermal energy.
5. Identify converters that change thermal to mechanical, fluid or electrical energy.
6. Apply by demonstration what is meant by the efficiency of an energy converter.

13.04 DEMONSTRATE THE USE OF TRANSDUCERS RELATED TO MECHANICAL, THERMAL, FLUID AND AIR SYSTEMS--

The student will be able to:

1. Define a transducer as a device that senses mechanical, fluid, electrical or thermal information.
2. Apply the action of a transducer.
3. Distinguish between an energy converter and a transducer.
4. Identify transducers that change mechanical signals into electrical signals.
5. Identify transducers that change fluid signals into mechanical or thermal information.
6. Identify transducers that change electrical signals into mechanical or thermal information.
7. Identify transducers that change thermal signals into mechanical, fluid or electrical information.

13.05 DEMONSTRATE THE CONCEPT OF RADIATION RELATED TO MECHANICAL, ELECTRICAL, FLUID, AIR AND THERMAL SYSTEM--

The student will be able to:

1. Define what is meant by "radiation."
2. Define what is meant by "electromagnetic" radiation.
3. Define what is meant by "nuclear" radiation.
4. Identify workplace applications where technicians measure or control radiation.

13.06 DEMONSTRATE PRINCIPLES OF OPTICAL SYSTEMS RELATED TO MECHANICAL, THERMAL, FLUID, AIR AND ELECTRICAL SYSTEMS--

The student will be able to:

1. Demonstrate how light can be represented by light rays.
2. Demonstrate how light can be represented by waves.
3. Identify the special characteristics of laser light.
4. List several optical systems that "process" light.
5. Identify workplace applications where technicians measure and control light.

13.07 DEMONSTRATE SOLUTION TO TIME CONSTANTS AS APPLIED TO MECHANICAL, FLUID, AND ELECTRICAL SYSTEMS--

The student will be able to:

1. List the distinguishing factors of uniform and non-uniform change.
2. Define a "time constant."
3. Identify systems where time constants are needed to describe system behavior.
4. Define three time constants.
5. Give examples of time constants in mechanical, fluid, electrical and thermal energy systems.
6. Identify workplace applications where technicians measure and control time constants.

Appendix